Attention-Deficit/Hyperactivity Disorder in adults

A study of treatment and outcome in different age groups

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The present thesis is based on two studies, the *SIBBE*[1] and the *Fifty Plus* study, of samples of adults with ADHD in different age groups that have been conducted at the Women and Children's Division, the Division of Mental Health and Addiction, and the Division of Surgery and Clinical Neuroscience, Oslo University Hospital. The *SIBBE* study was made possible due to financial support from The Norwegian Directorate of Health. The *Fifty Plus* study was financially supported by a grant from ExtraStiftelsen (2009/1/0661).

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[1] SIBBE Studie om iverksatt behandling, behandlingsforløp og effektevaluering

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SUMMARY

Attention-deficit/hyperactivity disorder (ADHD) is a neuropsychiatric disorder that starts in childhood and, in a large number of cases, persists into adulthood. Pharmacotherapy, often with stimulant medication, is considered to be one of the cornerstones in treatment of ADHD. Although the efficacy of short-term pharmacological treatment in adults with ADHD is well documented, research on long-term treatment outcome is scarce. Little is known about the course of the disorder in middle-aged and older adults.

The thesis presents two questionnaire surveys in adults with ADHD in different age groups, carried out in 2008-2010. The aim of the *SIBBE*[2] study (n=1080, mean age 36 years) was to investigate long-term outcome in a naturalistic sample of pharmacologically treated adults with ADHD. A survey of agreement between primary care physicians and patients on treatment of ADHD was part of the *SIBBE* study. The aim of the *Fifty Plus* study (n=251, mean age 56 years) was to investigate pharmacological treatment and quality of life in adults with ADHD who were fifty years and older.

In the *SIBBE* study the response rate of 35 % was lower than expected. ADHD symptoms and impairment at baseline did not differ substantially between participants and non-participants. In the *Fifty Plus* study more than 59 % of the eligible sample could be included for further analyses. The mean observation time in the *SIBBE* study was 4.5 years, whereas it was 5.7 years in the *Fifty Plus* study.

We found that among participants, 4-5 years after initiation, the majority reported current psychopharmacological treatment for ADHD, most often with stimulant medication. The primary care physicians and their patients agreed on the pharmacological, but not the nonpharmacological treatments that had been given. Physicians and ADHD patients reported low levels of misuse of stimulant medication. Adults treated pharmacologically for more than 24 months reported significantly more favorable outcome than those treated for 24 months or less. Only a minority of participants reported levels of ADHD symptomatology and current

[2] SIBBE study on initiated treatment, treatment course and treatment evaluation (Studie om iverksatt behandling, behandlingsforløp og effektvurdering)

functioning that could be classified as remission. Middle-aged and older adults with ADHD reported significantly reduced quality of life compared with population norms. Comorbidity at baseline, ADHD symptom severity, and unemployment were associated with poorer outcome.

The findings indicate that for many subjects the negative impact of ADHD persisted into late adulthood. Psychopharmacological treatment for more than two years was associated with better outcome and should probably be recommended for those who report improvement with this treatment without significant side effects. Primary care physicians can safely take responsibility for the psychopharmacological treatment of adults with ADHD when the condition is stable. For a majority of adults with ADHD comprehensive treatment approaches beyond ADHD symptom reduction are needed to improve outcome. Future studies on long-term multidimensional treatment programs for adults with ADHD are warranted.

ZUSAMMENFASSUNG

Die Aufmerksamkeitsdefizit-/Hyperaktivitätsstörung (ADHS) beginnt im Kindesalter und kann häufig bis in das Erwachsenenalter fortsetzen. Die medikamentöse Behandlung, die hauptsächlich mit Stimulanzien durchgeführt wird, gehört zu den wichtigsten Bestandteilen der ADHS-Therapie. Die Nützlichkeit derselben als kurzzeitige therapeutische Maßnahme ist wissenschaftlich gut dokumentiert. Dahingegen mangelt es an Forschungsstudien, in denen der Behandlungsverlauf über einen längeren Zeitraum untersucht wurde. Bisher gibt es nur wenige Erkenntnisse darüber, wie sich das Symptombild von ADHS bei älteren Menschen äussert.

Diese Doktorarbeit befasst sich mit der Untersuchung von zwei unterschiedlich alten Gruppen von Erwachsenen mit ADHS. Die hauptsächlich durch Fragebögen erhobenen Daten wurden im Zeitraum von 2008 bis 2010 gesammelt. In der *SIBBE*[3]-Studie (n=1060, Durchschnittsalter von 36 Jahren) war es das Ziel, eine natürliche Stichprobe von Erwachsenen mit ADHS zu untersuchen, die über einen längeren Zeitraum medikamentös für die ADHS behandelt worden waren. Eine Teiluntersuchung der *SIBBE*-Studie hat sich insbesondere mit dem Grad des Einvernehmens zwischen Arzt und Patient bezüglich der ADHS-Behandlung befasst. In der *Fünfzig Plus*-Studie (n=251, Durchschnittsalter von 56 Jahren) wurde sowohl die medikamentöse Behandlung als auch die Lebensqualität von älteren Erwachsenen mit ADHS untersucht.

Die Teilnahmequote in der *SIBBE*-Studie war mit 35 % geringer als erwartet. Unsere Analysen bezüglich der ADHS-Symptome sowie der Beeinträchtigung der generellen Funktionsfähigkeit haben aber keinen substantiell signifikanten Unterschied zwischen den Teilnehmern und denen, die nicht an der Untersuchung teilgenommen haben, aufgezeigt. In der *Fünfzig Plus*-Studie konnten 59 % der ursprünglichen Auswahl in die weitere Datenbearbeitung mit einbezogen werden. Die durchschnittliche Beobachtungszeit der *SIBBE*-Studie belief sich auf 4.5 Jahre, während dieselbe in der *Fünfzig Plus*-Studie bei 5.7 Jahren lag.

[3] Studie von Behandlung, Behandlungsverlauf, und der Beurteilung therapeutischer Maßnahmen (Studie om iverksatt behandling, behandlingsforløp og effektvurdering)

Die Mehrzahl der Teilnehmer gab zum Zeitpunkt beider Untersuchungen, das heisst 4-5 Jahre nach Behandlungsbeginn an, gegenwärtig medikamentös für die ADHS behandelt zu werden. Die medikamentöse Therapie wurde hauptsächlich mit Stimulanzien durchgeführt. Wir beobachteten ein groβes Einvernehmen zwischen Hausarzt und Patient bezüglich der medikamentösen Therapie. Allerdings waren sich Hausarzt und Patient nicht sehr einig, was andere therapeutische Maβnahmen betraf. Der Missbrauch von Stimulanzien wurde von Hausärzten und Patienten übereinstimmend als gering eingeschätzt. Die Erwachsenen, die länger als zwei Jahre medikamentös für die ADHS behandelt worden waren, hatten ein signifikant besseres Resultat als diejenigen, die zwei Jahre oder kürzer in medikamentöser Behandlung gewesen waren. Dennoch war es letztendlich nur ein geringer Anteil der Teilnehmer, der eine mit der Normalauswahl vergleichbare ADHS-Symptombelastung und allgemeine Funktionsfähigkeit erreichte. Im Vergleich zu einer gleichaltrigen Bevölkerung schätzten ältere Erwachsene mit ADHS ihre Lebensqualität als signifikant schlechter ein. Unsere Untersuchungen ergaben, dass das Vorhandensein von psychiatrischen Komorbiditäten, das Ausmaβ der ADHS-Symptombelastung und die Arbeitslosigkeit mit einem schlechteren Resultat assoziiert waren.

Unsere Befunde deuten darauf hin, dass die negativen Auswirkungen der ADHS für viele Patienten in das ältere Erwachsenenleben fortsetzen. Die medikamentöse Behandlung der ADHS für mehr als zwei Jahre war mit einem besseren Resultat verbunden und sollte wahrscheinlich für alle diejenigen als wünschenswert empfohlen werden, die eine derartige Therapie mit gutem Erfolg und ohne ernsthafte Nebenwirkungen vertragen können. Hausärzte können die Verantwortung für die medikamentöse Behandlung von Erwachsenen mit ADHS übernehmen. Dieses setzt jedoch voraus, dass der ADHS-Zustand zuvor therapeutisch hinreichend stabilisiert worden ist. Für die Mehrzahl der Erwachsenen mit ADHS besteht aber dennoch der Bedarf von umfassenden therapeutischen Maβnahmen, die über die rein medikamentöse Behandlung hinausgehen. Dieses erfordert, dass der Einsatz von mehrdimensionalen, therapeutischen Maβnahmen in der Behandlung von Erwachsenen mit ADHS und dessen Langzeiteffekt in zukünftigen Studien weiter untersucht werden.

LIST OF PAPERS

The thesis is based on the following four original papers:

Paper I

Lensing MB, Zeiner P, Sandvik L, Opjordsmoen S: **Four-year Outcome in Psychopharmacologically Treated Adults With Attention-Deficit/Hyperactivity Disorder: A Questionnaire Survey.** *J Clin Psychiatry* 2013; 74 (1):e87-e93

Paper II

Lensing MB, Zeiner P, Sandvik L, Opjordsmoen S. **Adults with ADHD: use and misuse of stimulant medication as reported by patients and their primary care physicians.** *ADHD Attention Deficit and Hyperactivity Disorders* [Epub ahead of print 2013 Aug 22]

Paper III

Lensing MB, Zeiner P, Sandvik L, Opjordsmoen S. **Psychopharmacological Treatment of Attention-Deficit/Hyperactivity Disorder in Adults Aged 50+: An Empirical Study.** (*submitted*)

Paper IV

Lensing MB, Zeiner P, Sandvik L, Opjordsmoen S. **Quality of Life in Adults Aged 50+ With ADHD.** *Journal of Attention Disorders* [Epub ahead of print 2013 March 20]

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ABBREVIATIONS

ADHD	Attention-deficit/hyperactivity disorder
ANOVA	Analysis of variance
APA	American Psychiatric Association
APD	Antisocial Personality Disorder
ASRS	Adult ADHD Self Report Scale
ASRS Screener	Adult ADHD Self Report Scale (ASRS v1.1) - Screener
AAQoL	Adult attention-deficit/hyperactivity disorder quality-of-life scale
CBT	Cognitive behavior therapy
CD	Conduct disorder
DAMP	Dysfunction in attention, motor control and perception
DCD	Developmental Coordination Disorders
DCR	Diagnostic Criteria for Research
DSM	Diagnostic and Statistical Manual of Mental Disorders
EQ-5D	EuroQol-5D
HRQoL	Health-related Quality of Life
ICD	International Classification of Diseases
JAMA	Journal of the American Medical Association
MBD	Minimal Brain Disorder or Dysfunction
MHI-5	Mental Health Index-5
MPH	Methylphenidate
MTA study	Multimodal Treatment Study of Children with ADHD
NCS-R	National Comorbidity Survey Replication
NICE	National Institute for Health and Clinical Excellence
NorLAG	Norwegian study of life course, ageing and generation
ODD	Oppositional Defiant Disorder
OR	Odds ratio
PCP	Primary care physician
QoL	Quality of Life
SCL-90-R	Symptom Checklist 90-Revised
SCL-90-R GSI	Symptom Checklist 90-Revised Global Severity Index
SD	Standard deviation
SDS	Sheehan Disability Scale

SF-36	Short Form 36
SIBBE	Study on initiated treatment, treatment course and treatment Evaluation/Studie om iverksatt behandling, behandlingsforløp og effektvurdering
SRIQ	Self Reported Improvement Question
SUD	Substance Use Disorder(s)
SWLS	Satisfaction With Life Scale
TR	Text revised
USA	United States of America
VAS	Visual Analogue Scale
WHO	World Health Organization

“Kroppen lider endast av nuets onda - men själen lider också av det som varit och det som skall komma.” (Epicurus, 341-270 BCS)

1. INTRODUCTION

1.1 Historical perspectives

Attention-deficit/hyperactivity disorder (ADHD) is the diagnostic term for a syndrome characterized by persistent problems of inattention, hyperactivity, and impulsivity (American Psychiatric Association 2000). Although scientific descriptions of the impairing problems with these symptoms can be traced back for more than two centuries (Barkley and Peters 2012;Crichton 2008;Still 1902), research on adults struggling with such problems first started in the late 1960s (Barkley et al. 2008).

By that time, the terminology of the syndrome already had changed many times primarily depending on the etiological concepts (Weiss and Hechtman 1993), e.g., hyperkinetic disease of infancy (Neumarker 2005), Minimal Brain Damage or Minimal Brain Dysfunction (Clements and Peters 1962), and hyperkinetic behavior syndrome in children (Laufer and Denhoff 1957). In 1968 the disorder was included in the diagnostic manuals as "*hyperkinetic reaction of childhood*" in the DSM[4]-II (American Psychiatric Association 1968), and a few years later as "*hyperkinetic syndrome of childhood"* in the ICD[5]-8 (World Health Organization 1974). Hyperactivity was seen as the primary marker, and exemplified by overactivity, restlessness, distractibility, and short attention span, especially in young children (American Psychiatric Association 1968). Generally, it was expected that "*this syndrome tends to wane spontaneously and disappear*" (Laufer and Denhoff 1957) by adolescence (American Psychiatric Association 1968).

Historically, it is often argued that the first scientific reference of the disorder can be found in Still's Goulstonian lectures published in 1902 (Barkley 1998;Conners 2000;Triolo 1999;Weiss and Hechtman 1993). Here Still described children who were characterized by a "*lack of moral control*", an "*incapacity for sustained attention"*, overactivity, and *"the immediate gratification of self without regard either to the good of others or to the larger and more remote good of self"* (Still 1902). Taylor (2011) has pointed out that although Still's "*descriptions of problem*

[4] DSM Diagnostic and Statistical Manual of Mental Diseases
[5] ICD International Classification of Diseases

behavior certainly overlap with ADHD…" they *"… do not give primacy to* [the core symptoms of ADHD] *impulsiveness, overactivity, or inattention* (Taylor 2011).

The conceptualization and understanding of what today is known as ADHD changed when research showed that it was not over- or hyperactivity but "*symptoms involving inability to sustain attention and to control impulsivity* [that] *can account for most of the deficits in the hyperactive group"* (Douglas 1972).

Interestingly, investigations have found that descriptions of problems with attention had been published a long time before Still gave his lectures in the beginning of the 19th century. For example, Crichton already in 1798 probably described what today is known as the "*Inattentive Subtype of ADHD*" (Palmer and Finger 2001). In his paper on "*attention and its diseases"*, Crichton defined attention difficulties as "*the incapacity of attending with a necessary degree of constancy to any one object"* (Crichton 1798, reprinted in the Journal of Attention Disorders 2008). Almost anticipating today's knowledge about the impact of heredity on ADHD, he stated that this incapacity "*either* [can be] *born with a person, or it may be the effect of accidental diseases. When born with a person it becomes evident at a very early period of life, and has a very bad effect, inasmuch as it renders him incapable of attending with constancy to any one object of education"* (Crichton 2008).

Still, Crichton probably was not the first to address this issue in the medical textbooks. Barkley & Peters (2012) recently claimed that it was the German physician Weikard's description of attention deficit ("*Attentio Volubilis*") from 1775 that might be the earliest scientific reference to ADHD (Barkley and Peters 2012). Indeed, Weikard's presentation of attention deficits is quite in line with nowadays understanding of essential aspects of the disorder. In his book the following vivid description of attention problems is given: "*An inattentive person won't remark anything but will shallow everywhere. He studies his matters only superficially; his judgments are erroneous and he misconceives the worth of things because he does not spend enough time and patience to search a matter individually or by the piece with the adequate accuracy. Such people only hear half of everything; they memorize or inform only half of it or do it in a messy manner. According to a proverb they generally know a little bit of all and nothing of the whole"* (Barkley and Peters 2012).

Interestingly, both Weikard and Crichton did not limit their descriptions to childhood, but included a possible persistence of these problems into adulthood. However, none of them actually described ADHD, because the diagnosistic definition of the disorder did not exist at that time (Singh 2008).

According to Barkley it was in the late 1960s that mainly three sources contributed to the growing understanding that ADHD not only was a childhood disorder, but also could persist into adulthood (Barkley et al. 2008). First, follow-up studies of hyperactive children showed that many had persistent problems into young adulthood (Menkes et al. 1967;Weiss et al. 1971). Second, family studies revealed that a number of parents of hyperactive children were considered to have been hyperactive themselves, and when assessed in adulthood were found to have increased rates of psychiatric problems (e.g. hysteria, sosiopathy, and alcoholism), whereas parents of adopted hyperactive children did not differ from normal controls (Cantwell 1972;Morrison and Stewart 1971;Morrison and Stewart 1973). The third source of evidence was upcoming descriptions of adults supposed to have been hyperactive during childhood, but who never had been diagnosed (Gomez et al. 1981;Morrison 1979;Quitkin and Klein 1969;Shelley and Riester 1972).

Consequently, by the mid seventies for example Mann and Greenspan (1976) suggested that "*adults who have had minimal brain dysfunction as children constitute a distinct diagnostic entity, adult brain dysfunction (ABD), which may exist alone or with a variety of other psychiatric syndromes"* (Mann and Greenspan 1976). Yet, the diagnostic manuals of DSM-III (American Psychiatric Association 1980), DSM-III-R (American Psychiatric Association 1987), and DSM-IV (American Psychiatric Association 1994) did not include detailed criteria for ADHD in adults (Triolo 1999).

The American psychiatrist Wender (1995) was the first to describe a set of diagnostic criteria for ADHD in adults[6] (Wender 1995). It has been argued that Wender's diagnostic criteria, with an emphasis on mood lability, irritability, hot temper, and impaired stress tolerance as important associated features of the disorder (Wender 1995), were not in line with the conceptualization of ADHD in the diagnostic

[6] UTAH Criteria for ADHD in Adults

manuals (Barkley et al. 2008). Recent research on emotional lability and dysregulation in children, adolescents, and adults with ADHD (Barkley and Fischer 2010;Retz et al. 2012;Sobanski et al. 2010;Surman et al. 2011) has shown that some of his diagnostic considerations are valuable for at least a subgroup of patients in the ADHD spectrum.

Nowadays scientific evidence support the understanding of ADHD as a neurobiological, highly heritable childhood disorder that in a number of cases can persist into adulthood (Biederman and Faraone 2005;Elia et al. 1999;Goldman et al. 1998;Swanson et al. 1998). Obstetric complications and psychosocial adversities have been identified as some of the possible predisposing risk factors (Biederman and Faraone 2005). Still, no single test alone verifies the diagnosis of ADHD (Zametkin and Ernst 1999).

1.2 Diagnostic criteria, subtypes and prevalence of ADHD

1.2.1 Diagnostic criteria and subtypes of ADHD

According to ICD-10 DCR[7] (World Health Organization 1993) and DSM-IV-TR[8] (American Psychiatric Association 2000), hyperkinetic disorder and ADHD are defined by a total of 18 symptoms of inattention, hyperactivity, and impulsivity.

Symptoms must have persisted for at least six months to a degree that is maladaptive with the developmental level. Further, an onset before the age of seven years, and impairment in two or more settings and in social, academic or occupational functioning is required (American Psychiatric Association 2000;World Health Organization 1992). Symptoms of inattention, and hyperactivity, and impulsivity must not be better accounted for by another mental disorder (American Psychiatric Association 2000;World Health Organization 1993) (see Table 1 for a detailed overview of the diagnostic criteria for ADHD according to DSM-IV-TR).

[7] DCR diagnostic criteria for research
[8] TR text revision

Table 1 Diagnostic criteria for Attention-Deficit/Hyperactivity Disorder according to DSM-IV-TR

A. Either (1) or (2):

(1) six (or more) of the following symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Inattention

(a) often fails to give close attention to details or makes careless mistakes in schoolwork, work, or other activities
(b) often has difficulty sustaining attention in tasks or play activities
(c) often does not seem to listen when spoken to directly
(d) often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions)
(e) often has difficulty organizing tasks and activities
(f) often avoids, dislikes, or is reluctant to engage in tasks that require sustained mental effort (such as schoolwork or homework)
(g) often loses things necessary for tasks or activities (e.g., toys, school assignments, pencils, books, or tools)
(h) is often easily distracted by extraneous stimuli
(i) is often forgetful in daily activities

(2) six (or more) of the following symptoms of **hyperactivity-impulsivity** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

Hyperactivity

(a) often fidgets with hands or feet or squirms in seat
(b) often leaves seat in classroom or in other situations in which remaining seats is expected
(c) often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
(d) often has difficulty playing or engaging in leisure activities quietly
(e) is often "on the go" or often acts as if "driven by a motor"
(f) often talks excessively

Impulsivity

(g) often blurts out answers before questions have been completed
(h) often has difficulty awaiting turn
(i) often interrupts or intrudes on others (e.g., butts into conversations or games)

B. Some hyperactive-impulsive or inattentive symptoms that caused impairment were present before age 7 years.

C. Some impairment from the symptoms is present in two or more settings (e.g., at school [or work] and at home).

D. There must be clear evidence or clinically significant impairment in social, academic, or occupational functioning.

E. The symptoms do not occur exclusively during the course of a Pervasive Developmental Disorder, Schizophrenia, or other Psychotic Disorder and are not better accounted for by another mental disorder (e.g., Mood Disorder, Anxiety Disorder, Dissociative Disorder, or a Personality Disorder).

Adapted from the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, text revision, American Psychiatric Association, 2000.

Although the wording of the symptoms is nearly identical, the conceptualization of the disorder differs somewhat between the ICD and DSM systems. Whereas nearly identical nine symptoms for inattention are used in the manuals, the symptom "*often talks excessively*" in the ICD-10-DCR is allocated to impulsivity, while it is one of

the six symptoms of hyperactivity in the DSM-IV/DSM-IV-TR (American Psychiatric Association 1994;American Psychiatric Association 2000;World Health Organization 1993).

The ICD-10 diagnosis of hyperkinetic disorder requires the presence of all three core symptoms. On the other hand, one of three different subtypes of ADHD depending on the presence of symptoms of inattention, hyperactivity, and impulsivity can be diagnosed according to the DSM-IV (combined type, predominantly inattentive type, and predominantly hyperactive-impulsive type). For adolescents and adults who currently have symptoms but no longer meet the full criteria for the disorder, ADHD In Partial Remission can be coded for in the DSM-IV-TR (American Psychiatric Association 2000). The concept of ADHD identifies a broader group of subjects than hyperkinetic disorder, which is defined more rigorous with respect to pervasiveness and comorbidity (Lee et al. 2008;Remschmidt 2005;Tripp et al. 1999). A recent study showed that in a sample of children with a DSM-IV diagnosis of ADHD Combined type, only 25 % met criteria for hyperkinetic disorder (Santosh et al. 2005). Although the question has been raised whether ADHD primarily is an American condition (Faraone et al. 2003), studies have shown that when trained clinicians used uniform, standardized criteria, the patient populations identified in samples in North America and outside of North America were generally very similar (Buitelaar et al. 2006). Nevertheless, it is challening that follow-up studies revealed only poor to modest subtype stability across age, and that so far no predictors of diagnostic stability across subtypes have been identified (Todd et al. 2008).

DSM-IV-TR and ICD-10-DCR do not specify separate diagnostic criteria for ADHD/hyperkinetic disorder in adults (Barkley et al. 2008;McGough and Barkley 2004). The diagnostic criteria for ADHD have never been validated in adults, and until recently no developmental adjustment or specific diagnostic threshold of number of criteria for ADHD for adults was given (Barkley et al. 2008;McGough and Barkley 2004). DSM-IV-TR does not specify if the ADHD subtype assignment should be based on the symptom presentation in childhood or adulthood (Barkley et al. 2008;McGough and Barkley 2004). The manual highlights that the diagnosis of ADHD in adults should not solely be based on an adult's recall of childhood problems with inattention, hyperactivity, and impulsivity, as this could be inaccurate

(American Psychiatric Association 2000). Whenever possible, collateral information should be asked for to complement retrospective data. In summary this means that adult ADHD still remains to be a primarily clinical diagnosis (McGough and Barkley 2004).

1.2.2 Prevalence of ADHD

The prevalence of ADHD in school-age children has been estimated to be 3 % to 7 % (American Psychiatric Association 2000). In line with this, a recent meta-analysis found the worldwide prevalence of ADHD in school-age children to be 5.3 % (Polanczyk et al. 2007). Although a large variability of prevalence rates among studies was observed, this mainly could be explained by methodological differences across studies (Polanczyk et al. 2007). As hyperkinetic disorder is considered to be a less broader type of ADHD, comparable prevalence rates in school-age children consequently have been estimated to be somewhat lower, e.g., 1 % to 3 % (Remschmidt 2005). Interestingly, a recent population-based study among school-age children in Europe found a prevalence rate of ADHD of 1.7 %. This result, which was much more in line with expected numbers for hyperkinetic disorder than the frequently reported prevalence rates for ADHD, was primarily explained by the inclusion of the impairment criteria, and methodological considerations regarding the data collection (Heiervang et al. 2007).

Follow-up studies of clinically referred samples of children with ADHD into adulthood revealed divergent rates of persistence, ranging from 4 % to 66 % (Barkley et al. 2002;Mannuzza et al. 1993;Mannuzza et al. 1998;Mannuzza et al. 2002;Rasmussen and Gillberg 2000;Weiss et al. 1985). Ascertainment procedures, attrition rates, information sources, and different type of ADHD criteria applied in these studies have all been suggested as possible explanations for the reported variability of persistence (Barkley et al. 2002;Mannuzza et al. 2003). Based on some of the early findings from follow-up studies, Hill and Schoener (1996) estimated the prevalence of ADHD in adults at age 40 to be 0.05 % (Hill and Schoener 1996). Others have argued that differences in reported remission rates rather reflect the definition of the disorder, and not the course of it (Biederman et al. 2000). When residual symptoms and functional impairment were included in a meta-analysis of

follow-up studies, the rate of persistent ADHD in young adulthood was estimated to be around 65 % (Faraone et al. 2006).

It was not before the year of 2006 that the first population-based prevalence data of ADHD in adults aged 18-44 years were available. As part of the large NCS-R[9] study, the prevalence of current adult ADHD in this age group in the USA[10] was found to be 4.4 % (Kessler et al. 2006). The study also revealed that the majority of adults with ADHD were untreated, had several comorbid disorders, and had significantly elevated odds of disability in self-care, mobility and cognition (Kessler et al. 2006). Interestingly, adults older than 44 years of age were not included in this study because of concerns about recall failure (Kessler et al. 2006).

A cross-national study on prevalence rates of adult ADHD found an estimated average of 3.4 % (Fayyad et al. 2007). Although the aforementioned findings from Kesssler et al. in many ways were confirmed in this study, somewhat lower prevalence rates of ADHD in lower income countries (1.9%) were observed (Fayyad et al. 2007). Finally, a recent meta-analysis estimated the pooled prevalence of adult ADHD across included samples to be 2.5 % (Simon et al. 2009). Among the reviewed studies, only one (Kooij et al. 2005) had included older adults (e.g., up to 75 years of age). Taken the limited findings with respect to study composition and mean age into consideration, the authors concluded that the prevalence of ADHD in adults seems to decline with age. At the same time they highlighted that as "*some children do not outgrow the disorder but outgrow the diagnostic criteria*", the true prevalence of ADHD may be underestimated when diagnosing adult ADHD according to the current versions of the diagnostic manuals (Simon et al. 2009).

The male-female ratio in children ranges from 3:1 to 9:1 mainly depending on subtype and setting (American Psychiatric Association 2000;Elia et al. 1999). In younger adults with ADHD a more balanced gender distribution, and even a predominance of women in one study, has been reported (Biederman et al. 1994;Biederman et al. 2004;Elia et al. 1999;Kessler et al. 2006).

[9] NCS-R National Comorbidity Survey Replication
[10] USA United States of America

In the recently published fifth edition of the DSM (DSM-5) some changes with respect to the diagnosis of ADHD have been made. The age of onset has been increased to prior to age 12 years. For older adolescents and adults a slightly lower diagnostic threshold with at least five out of six symptoms of inattention, and/or hyperactivity and impulsivity has been defined. The manual provides examples for all symptoms through parts of the lifespan, as well as it is required to specify the level of current severity from mild to severe (American Psychiatric Association 2013). Still, no separate criteria for adults with ADHD are given.

This latest version of the DSM estimates a prevalence rate of 2.5% for ADHD in adults, whereas the male-female ratio is specified to be 1.6:1. These numbers are well in line with what has been referred to in this chapter of the thesis. Interestingly, until 2012 no epidemiological data on ADHD in older adults were available. A recently published study found a prevalence of ADHD of 2.8 % in adults aged 71-94 years, which fits quite well with the latest scientific guidance provided in the DSM-5 (American Psychiatric Association 2013;Michielsen et al. 2012).

1.3 Clinical characteristics of adult ADHD

In adults the symptom presentation of inattention, hyperactivity, and impulsivity typically is somewhat different from what is seen in children. For instance, most adults not longer "*run or climb excessively in situations where this is inappropriate*" (American Psychiatric Association 2000), but they may well report about an inner restlessness, and an inability to slow down, to relax, or to work more than one job.

Hyperactivity can be expressed as excessive fidgeting (shaking knees, tapping hands or feet), difficulty sitting still for a long time when this is expected (in meetings, in the theatre or movie, and at home), a subjective feeling of always to be "on the go", not to be able to just stay at home, or to talk excessively without being able to engage in a mutual conversation with a spouse, friends or significant others.

Impulsivity can be expressed as impatience (difficulty to wait for others to finish tasks or activities, waiting in line at a gasoline station, at bank machines, in supermarkets), acting without thinking (quitting a job without having any alternatives), dangerous driving, leaving and starting new relationships on impulse,

and blurting things out (difficult to wait for others to finish what they are talking about, saying what comes in their mind without considering the situational appropriateness), and sensation seeking behavior (impulsive sexual activities and dangerous life situations).

Whereas symptoms of hyperactivity and impulsivity often are found to decline with an increasing age (Biederman et al. 2000;Faraone et al. 2006;Mick et al. 2004), attention problems can become more prominent in adulthood (Kessler et al. 2010;Kooij et al. 2010;Montano 2004). Thus, inattention can be expressed as difficulties in organizing and prioritizing tasks or activities (missed appointments, deadlines), completing tasks (postponing things endlessly, procrastination), difficulties with sustained attention in boring activities (reading a book without special interests, keep accounts, paying bills), distractibility, forgetfulness (don't remember what to buy in the supermarket despite of a list, and even forget to pick up own children from kindergarten), losing or misplacing things (keys, assignments, wallets), and feeling overwhelmed because of difficulties with mistakes in paperwork and time management. Inattention problems do not rule out that some exclusively can hyperfocus on one new, exciting or interesting activity.

Studies showed that the three core symptoms of the disorder only partly cover the challenges seen in daily life of many adults with ADHD (Haavik et al. 2010). Frequently reported symptoms of increased irritability, low frustration tolerance and emotional lability, as well as motivational problems may lead to even greater challenges in daily life (Asherson 2005;Gibbins and Weiss 2007;Haavik et al. 2010). Overall, the majority of adults with ADHD have been found to "*live chaotic and disrupted lives*" (Montano 2004).

1.4 ADHD in middle-aged and late adulthood

So far scientific research has been limited to younger adults with ADHD (Barkley 2002), and little is known about the course of the disorder in middle-aged and late adulthood (Riccio et al. 2005).

The possibility of a persistence of ADHD also into middle-aged and late adulthood emerges from at least four different aspects. First, research has shown that the

disorder can persist into young adulthood, and persistence for the lifespan has been suggested (Faraone et al. 2006). Second, there is overwhelming evidence that ADHD is highly heritable (Faraone et al. 2005), and already early research showed that it in many ways "*runs in families*" (Morrison and Stewart 1971;Morrison and Stewart 1973). Increasing availability of assessment and treatment for the disorder for adults contributes to the probability that both parents and grandparents will ask for an evaluation when they have recognized signs and symptoms of the disorder, after an often younger family member has been diagnosed with ADHD. Third, an increasing public awareness of ADHD in adults may cause that undiagnosed and untreated adults in all age groups will ask for an assessment for the disorder. The fourth aspect is highlighted through common clinical experience from assessment and treatment of middle-aged and older adults diagnosed with ADHD in late adulthood.

Until 2009 ADHD in middle-aged and older adults rarely had been discussed in the scientific literature (Matlen 2008a;Weiss et al. 2001). For example, as late as in 2008 da Silva et al (2008), when reporting about a successful treatment of a 67-year-old woman with ADHD with MPH[11], stated that they were unable to find reports of ADHD in elderly adults in the literature (da Silva and Louza 2008).

Probably one of the first broader descriptions of middle-aged adults with ADHD in the literature is given in a clinical crossroad article from 1998, published in JAMA[12] (Biederman 1998;Parker and Hartman 1999). Weiss and colleagues (2001) briefly addressed the topic of becoming older with ADHD in their book "*ADHD in Adulthood*" in a chapter on future directions and challenges (Weiss et al. 2001). Wetzel et al (2008) described two cases of older adults with ADHD (Wetzel and Burke 2008); whereas Matlen (2008) presented the case of a grandmother who was diagnosed with ADHD when she was 75 years of age (Matlen 2008b).

In a series of 10 different studies on adults and elderly with neuropsychiatric disorders including ADHD that so far only has been published in Swedish, Lindqvist (2004) reported about 28 adults (15 men and 13 women) with a primary diagnosis of DAMP[13]/ADHD who had passed 50 years of age when interviewed (Lindqvist

[11] MPH methylfenidate
[12] JAMA Journal of the American Medical Association
[13] DAMP deficits in attention, motor control and perception (Gillberg 2003;Gillberg and Gillberg 1988)

2004). The majority of adults reported no reduction of their activity level compared to earlier years. Hyperactivity had changed to restlessness, which many had managed to live with. Almost 50 % of the sample reported a worsening of memory, especially short-term memory, compared with when they were younger. Problems with inattention were unchanged for a large majority. The persistence of economical problems due to unemployment, and social and interpersonal problems was striking. Many had medical and psychiatric problems, such as fibromyalgia and depression. Interestingly, almost 50 % stated that they were satisfied with their current life. For most of the reported outcomes no gender differences were found (Lindqvist 2004).

Whereas Kessler et al (2006) in their prevalence study on ADHD did not include adults older than 44 years of age because of concerns of recall failure (Kessler et al. 2006), almost 50 % of the study sample in a European study on adult ADHD was 45 years and older (Kooij et al. 2005). In the latter more women than men participated. A small decline of hyperactivity symptoms with increasing age was found, while no influences of age on symptoms of inattention and impulsivity were reported (Kooij et al. 2005).

In the lack of knowledge about the adult population with ADHD, and questions about the course of the disorder, treatment options and quality of life (QoL[14]) also in middle-aged and older adults should be studied.

1.5 Comorbidity in adults with ADHD

The term "co-morbidity" refers to "*any distinct additional clinical entity that has existed or may occur during the clinical course of a patient having an index disease*" (Feinstein 1970). According to Feinstein, co-morbidity has at least "*functional effects*" on the patient with respect to anticipated outcome, and "*diagnostic effects*" on the clinician with the consequence that it may be difficult to identify the index disease (Feinstein 1970). In psychiatry, as pointed out by Maj (2005), the frequent use of the term comorbidity can become incorrect "*because in most cases it is unclear whether the concomitant diagnoses actually reflect the presence of distinct*

[14] QoL quality of life

clinical entities or refer to multiple manifestations of a single clinical entity" (Maj 2005).

In ADHD comorbidity is rather the rule than the exception, and it has been argued that "*pure ADHD"* actually may be an atypical variant of the disorder (Kadesjo and Gillberg 2001). The persistence of ADHD into adulthood has been found to be strongly associated with the presence of psychiatric comorbidity (Biederman et al. 1995). Studies showed that psychiatric comorbidity had a large impact on treatment outcome in ADHD (The MTA Cooperative Group 1999b).

Millberger et al. (1995) investigated the influence of overlapping symptoms on the diagnosis of ADHD and frequently occurring comorbid disorders (i.e., major depression, bipolar disorder, generalized anxiety disorder) (Milberger et al. 1995). The investigators concluded that ADHD was not an artifact of symptoms that were shared with other psychiatric disorders (Milberger et al. 1995).

Recent investigations in school-aged children with primarily a diagnosis of ADHD combined type in both North-America and Europe found high rates of comorbid disorders, such as ODD[15], anxiety, DCD[16], and CD[17] (Kadesjo and Gillberg 2001;The MTA Cooperative Group 1999a). The majority of these children had at least two comorbid disorders, and the "*pure type of ADHD*" was rare. Studies in adults with ADHD revealed a similar picture with increased rates of comorbid disorders compared to controls (i.e., anxiety disorder, mood disorder, personality disorder, and SUD[18]), and more than 60 % having at least one comorbid disorder (Biederman et al. 1993;Kooij et al. 2004;Sobanski 2006). Similar results have been reported in a recent epidemiological study where adult ADHD was found to be significantly comorbid with many other 12-month DSM-IV disorders (Kessler et al. 2006). Studies also showed that there was limited evidence for gender differences with respect to psychiatric comorbidity (Biederman et al. 1994;Biederman et al. 2004;Mannuzza and Gittelman 1984). High rates of lifetime comorbidity (87 %)

[15] ODD oppositional defiant disorder
[16] DCD developmental coordiantion disorder
[17] CD conduct disorder
[18] SUD substance use disorder(s)

were found in a sample of European adults with ADHD followed at an outpatient psychiatric clinic (Torgersen et al. 2006).

Although there is an overall acknowledgement of increased rates of comorbid conditions in adults with ADHD, reported prevalence rates and type of psychiatric comorbidity varies considerably depending on factors such as study design (e.g., prospective or retrospective), and sample collection (Marks et al. 2001;Sprafkin et al. 2007). Whereas most prospective and retrospective studies reported increased rates of anxiety disorders, mood disorders, personality disorders, and SUD (Biederman et al. 1994;Biederman et al. 2006c;Biederman et al. 2006d;Fischer et al. 2002;Murphy and Barkley 1996;Murphy et al. 2002;Philipsen 2006;Rasmussen and Gillberg 2000;Shekim et al. 1990;Sobanski et al. 2007), others found no statistical difference of affective or anxiety disorders when adults with ADHD were compared to controls (Mannuzza et al. 1993;Mannuzza et al. 1998). In addition, increased rates of neurodevelopmental disorders, learning difficulties, and sleep disorders have been reported (Philipsen et al. 2006;Rasmussen et al. 2001;Rasmussen and Gillberg 2000;Schredl et al. 2007). Whereas some studies reported differences between clinical and nonclinical samples, and for the different subtypes of ADHD (Sprafkin et al. 2007), others could not confirm such findings (Able et al. 2007;Biederman et al. 2005a;Sobanski et al. 2008). Although increased lifetime prevalence of psychiatric comorbid disorders was found to be significantly different in samples of adults with ADHD compared to controls (Biederman et al. 2006c;Biederman et al. 2006d), the one-year prevalence rates for mood and anxiety disorders were low, and not significantly different from controls in at least one of these studies (Biederman et al. 2006d).

In summary, increased rates of especially psychiatric comorbid disorders consistently have been reported in clinical and nonreferred samples of adults with ADHD. Most studies have investigated samples of younger adults with ADHD and little is known about the course of the disorder and the impact that comorbidity might have in middle-aged and older adults. Interestingly, in cases where adults with ADHD had found strategies to cope with their deficits, outcome was not always poor (Shekim et al. 1990).

Whether medical conditions influence outcome has rarely been investigated. ADHD has been found to be associated with an increased risk for major injuries and asthma that may affect life expectancy. Moreover, an increased risk for cardiovascular disease, which might have implications for psychopharmacological treatment, has been suggested (Barkley 2002).

1.6 Treatment

1.6.1 Psychopharmacological treatment of adults with ADHD

Pharmacotherapy, most often with stimulant medication, is one of the cornerstones in treatment of the core ADHD symptoms across the lifespan (Elia et al. 1999;Swanson et al. 1998).

Historically, Bradley (1937) was the first to describe the effects of Benzedrine (racemic amphetamine) on learning and emotional state in children with a variety of behavioral disorders (Bradley 1937). It was not before the 1960s that improvement in attention span, reduced hyperactivity and impulsivity, a better motor coordination, and an increase of useful productivity in children with MBD[19]/ADHD became the main targets of psychopharmacological treatment, primarily with Ritalin® (methylphenidate) (Clements and Peters 1962;Douglas 1972;Knobel 1962;Lange et al. 2010;Taylor 2011).

Probably one of the first descriptions in the literature of treatment with stimulant medication of adult ADHD is by Arnold et al. (1972). In a double blind, single case study they compared treatment with amphetamine and placebo in a young male adult patient with a previously undiagnosed hyperkinetic syndrome. Treatment with stimulant medication resulted in increased concentration, but also decreased anxiety and increased depression (Arnold et al. 1972). Arnold suggested a "*paradoxical calming*" effect of stimulant medication, but this hypothesis was disproved in a study by Rapoport et al. (1980) where no unique stimulant response in hyperactive children was found compared to normal controls (Rapoport et al. 1980).

[19] MBD minimal brain disorder or dysfunction

Over the next three decades a number of open or double-blind placebo controlled studies of treatment with MPH (Bouffard et al. 2003;Gualtieri et al. 1985;Kooij et al. 2004;Mattes et al. 1984;Spencer et al. 1995;Spencer et al. 2005;Wender et al. 1985;Wood et al. 1976) and amphetamine (Paterson et al. 1999;Spencer et al. 2001) were performed in adults with ADHD.

A meta-analysis of the efficacy of MPH in treatment of adults with ADHD from 2004 found a large effect size (between 0.9 and 1.3 depending on optimized high doses of MPH and physician ratings of outcome rather than patients' self-report) (Faraone et al. 2004). This investigation included only six studies with a total of 140 MPH-treated adults with ADHD (Faraone et al. 2004). As pointed out by others, most studies also had a short observation time (4-12 weeks) (Myhre 2005). Despite that many of the participants reported improvement on treatment with stimulant medication, quite a lot did not, and side effects were mentioned frequently in both treatment and placebo groups (Myhre 2005).

The efficacy of newly developed long-acting compounds in adults with ADHD has been shown in several randomized placebo-controlled studies, such as for Concerta® (OROS methylphenidate) (Biederman et al. 2006b), Strattera® (atomoxetine) (Michelson et al. 2003;Spencer et al. 1998), and mixed amphetamine-salts (Adderal®) (Spencer et al. 2001;Weisler et al. 2006). Yet, a comparative review on benefits and harms of competing medications for adults with ADHD found that immediate-release MPH still should be considered to be the first-line treatment for the majority of adults with the disorder (Peterson et al. 2008).

Extended use of psychopharmacological treatment in adults with ADHD more recently was challenged due to a suspected risk of serious cardiovascular side effects (Biederman et al. 2006e;Nissen 2006), a lack of long-term follow-up data (Myhre 2005;Spencer et al. 2004;Torgersen et al. 2008), high attrition rates in open label treatment studies (Biederman et al. 2005b;Wilens et al. 2005), and poor adherence to treatment with stimulant medication (Perwien et al. 2004;Swanson 2003;Torgersen et al. 2008). Several researchers pointed out that study samples included in clinical trials only to a limited degree reflect the variation in adult ADHD seen in clinical practice (Surman et al. 2010;Weiss et al. 2006). With respect to

psychopharmacological treatment of middle-aged and older adults with ADHD until 2008 only limited scientific information was available (Weiss et al. 2001).

Summarizing current knowledge on psychopharmacological treatment of adult ADHD, Torgersen et al. (2008) concluded, "*both clinicians and patients should not be dazzled by the initial good response that may come"* (Torgersen et al. 2008). For many adults pharmacotherapy for ADHD will not be sufficient for remission of the disorder.

1.6.2 Psychosocial treatment of adults with ADHD

The need for nonpharmacological and psychosocial interventions in treatment of adults with ADHD emerges from different aspects. There are several limitations in the effect of psychopharmacological treatment as mentioned above (Dulcan 1997;Taylor et al. 2004). A substantial number of adults with ADHD are considered to be nonresponders to pharmacotherapy because of insufficient symptom reduction, or that they cannot tolerate this kind of treatment (Safren et al. 2004). Even among those who are considered responders to pharmacotherapy, symptom reduction often seems not to be optimized because of a lack of strategies to handle associated functional impairment (Safren et al. 2004). Finally, some adults with ADHD may be skeptical to pharmacotherapy, and prefer nonpharmacological interventions. Thus, multimodal interventions, e.g., involving psychoeducation and psychotherapy, have been strongly recommended as the first choice of appropriate treatment for adults with ADHD (Gibbins and Weiss 2007;Nutt et al. 2007;Wender et al. 2001). Being diagnosed with ADHD in adulthood, for many will start a process where one has to reconciliate with the past, manage the emotional impact of the diagnosis, and to make considerations for the future (Bemporad 2001;Young et al. 2008).

Wiggins et al. (1999) were among the first to show that a structured brief group intervention could result in significant improvement in adults with ADHD (Wiggins et al. 1999). Likewise did a cognitive remediation group program (Stevenson et al. 2002), and a structured skill training group program based on the principles of cognitive-behavioral treatment for borderline personality disorder (Hesslinger et al. 2002;Philipsen et al. 2007) revealed significant improvements in ADHD

symptomatology and associated features. Others investigated the advantage of individual based CBT[20] approaches for ADHD treatment (Safren 2006). A combination of pharmacotherapy with CBT or problem-focused therapy was found to be associated with significant improvements in clinical outcomes (Rostain and Ramsay 2006;Weiss and Hechtman 2006). Self-directed psychosocial intervention with only limited therapist contact, was found only to be successful when adults with ADHD were able to closely adhere to the program (Stevenson et al. 2003).

Despite these promising findings, upon 2007 the empirical evidence for the efficacy of psychosocial approaches and psychotherapy in treatment of adults with ADHD still was considered to be limited (Murphy 2005;Murphy 1998;Ramsay 2007).

1.7 Outcome

1.7.1 Prospective follow-up studies from childhood to adulthood

ADHD in children, adolescents and young adults is considered to be a treatable condition, but the impact of treatment on outcome has been questioned (Biederman and Faraone 2005;Elia et al. 1999;Faraone 2005;Goldman et al. 1998;Swanson et al. 1998).

The value of well-designed longitudinal studies is to "*answer questions which cross-sectional data cannot answer*" (Sexton 1963). In the field of ADHD four longitudinal studies have been published that have followed children with the disorder into young adulthood [e.g., the Montreal study (Weiss et al. 1985), the New York study (Mannuzza et al. 1993), the Gothenburg study (Rasmussen and Gillberg 2000), and the Milwaukee study (Barkley et al. 2002)]. As mentioned in Chapter 1.2.2, these studies differ on several important aspects, e. g., disorder criteria (for example different inclusion criteria for the Gothenburg and the New York study), attrition rates (up to 35 % in the Montreal study), reporting sources (for example self-report versus parent report), and ascertainment procedures (clinically referred in the Montreal, New York and Milwaukee studies versus community based in the Gothenburg study) (Mannuzza et al. 2003). Therefore, any interpretation of outcome

[20] CBT cognitive behavior therapy

data of a persistence of ADHD into adulthood from these studies has to take the aforementioned limitations into consideration.

Overall and on a group level, outcome of young adults with ADHD in all studies was "*worse than expected*" (Rasmussen and Gillberg 2000). Compared to controls, young adults with ADHD had significantly higher rates of antisocial personality disorder (Fischer et al. 2002;Mannuzza et al. 1998;Rasmussen and Gillberg 2000;Weiss et al. 1985), SUD (Barkley et al. 2004;Fischer et al. 2002;Mannuzza et al. 1998;Rasmussen and Gillberg 2000), other personality disorders (Fischer et al. 2002), and criminality (Fischer et al. 2002;Rasmussen and Gillberg 2000). The increased risk for criminality in adulthood was mediated by the development of CD and SUD in adolescence (Fischer et al. 2002;Mannuzza et al. 1998).

Whereas results from the New York study indicated that ADHD even in the absence of comorbid CD in earlier years increases the risk for antisocial personality disorder and SUD in adolescence (Mannuzza et al. 1998), a 30 year follow-up study of hyperactive boys with and without CD did not find an increased risk for later criminality in those without CD (Satterfield et al. 2007). A European follow-up study found girls with ADHD and conduct problems to have elevated risk of a psychiatric admission in adulthood (Dalsgaard et al. 2002) With respect to mood disorders some reported increased rates (Fischer et al. 2002), whereas others did not find significantly higher rates of mood or anxiety disorders (Mannuzza et al. 1998).

Compared to controls outcome of childhood ADHD in young adulthood showed more problems on major life activities such as educational, occupational, financial, social, and sexual functioning (Barkley et al. 2006;Mannuzza et al. 1997). Longitudinal studies also showed that a majority of young adults with ADHD were employed (Borland and Heckman 1976;Mannuzza et al. 1997), and that ADHD for some did not "*preclude attaining high educational and vocational goals*" (Mannuzza and Klein 2000).

Although individual characteristics (i.e., intelligence, emotional instability, low frustration tolerance), and family parameters (i.e., socioeconomic class, mental health of family members) have been found to be important predictor variables, it has been argued that it is the "*multitude of interacting factors*" that predict outcome

(Hechtman et al. 1984b;Hechtman 1991;Hechtman 1999;Mannuzza et al. 1998). The prediction of outcome in general probably still may be summarized best as done by Cantwell and Hechtman several years ago. They categorized outcome in adulthood generally to fall into three groups: a fairly normal outcome (developmental delay); a persistence of attentional, social, emotional, and impulse problems (continual display); and an outcome with serious psychiatric and/or social pathology (developmental decay) (Cantwell 1985;Cantwell 1996;Hechtman et al. 1984b;Hechtman 1991).

The impact of long-term stimulant treatment on outcome, either alone or in combination with psychosocial interventions, has been beyond the expectations and "*mostly disappointing*" (Hechtman et al. 1984a;Jensen et al. 2007;Molina et al. 2007;Satterfield et al. 2007). On the other hand, two of the longitudinal studies provided some scientific evidence that early treatment with stimulant medication did not increase the risk for development of SUD in adolescence and young adulthood (Barkley et al. 2003;Mannuzza et al. 2008).

1.7.2 Functional impairment

The diagnosis of ADHD or hyperkinetic disorder requires not only a persistent pattern of inattention, hyperactivity, and impulsivity with an onset before the age of seven, but also the presence of impairment in two or more domains (American Psychiatric Association 2000;World Health Organization 1993).

It is "*impairment and not* [the] *diagnosis that is the indication for treatment*" (Weiss et al. 2001). Indeed, the relationship between symptoms of ADHD and impairments mostly has been found to be not stronger than modest to weak (Barkley et al. 2008;Gordon et al. 2006;Weiss et al. 2001). In clinical practice this means "*someone can display the full range of ADHD-type symptoms without necessarily displaying significant impairment. Conversely, one can also show few ADHD symptoms and still suffer significant maladjustment…*"(Gordon et al. 2006). For adults with ADHD the issue of a "*symptomatic persistence*", i.e., a partial diagnostic status of ADHD with impairment has been pointed out to be important (Faraone et al. 2006;Mick et al. 2004).

In both diagnosed and undiagnosed samples of adults with ADHD several domains consistently have been found to be impaired when compared to controls. Thus, the impairment leads to psychosocial disabilities such as lower educational attainment (Able et al. 2007;Barkley et al. 2006;Biederman et al. 1993;Biederman et al. 2006a;Heiligenstein et al. 1999;Mannuzza et al. 1993;Mannuzza et al. 1997;Murphy and Barkley 1996), lower levels of employment (Able et al. 2007;Biederman et al. 2006a), lower work performances (De Graaf et al. 2008;Kessler et al. 2005a;Murphy and Barkley 1996), lower occupational achievement (Borland and Heckman 1976;Mannuzza et al. 1997;Matza et al. 2005a), and lower socioeconomic status (Able et al. 2007;Biederman et al. 1993;Borland and Heckman 1976).

Studies also have shown an association between ADHD and increased healthcare costs (Birnbaum et al. 2005;Harpin 2005;Hinnenthal et al. 2005;Matza et al. 2005a;Secnik et al. 2005). Adults with ADHD reported more often about problems of family dysfunction, poorer marital adjustment, and higher rates of separation and divorce (Biederman et al. 1993;Biederman et al. 2006a;Eakin et al. 2004;Harpin 2005;Murphy and Barkley 1996). Increased driving risks and higher numbers of traffic citations compared to controls have also been observed in adults with ADHD (Able et al. 2007;Barkley and Cox 2007).

According to Barkley (2008) the total impairment across domains, and the number of domains often impaired (pervasiveness), together account for the severity of ADHD in adults (Barkley et al. 2008). Others have argued that not necessary the severity of ADHD, but the "*impairment relative to one's potential*" should be a sufficient justification for treatment (Weiss et al. 2001).

1.7.3 Quality of Life (QoL) in adults with ADHD

Patients' QoL has become an important aspect of outcome in medicine (Felce and Perry 1995;WHOQoL 1995). In line with recommenations from the WHO[21], QoL can be defined as "*individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns"* (WHOQoL 1995). The definition underline

[21] WHO World Health Organization

that one's perception of QoL is subjective, influenced by both positive and negative aspects of life, and is multi-dimensional (Felce and Perry 1995;WHOQoL 1995). For subjective wellbeing positive affect, negative affect, and life satisfaction all have been identified as separate, and important components (Diener 1984;Diener et al. 1985).

While QoL is broadly conceptualized, health-related quality of life (HRQoL[22]) more specific refers to "*those aspects of an individuals' life that impact directly upon their health"* (Guyatt et al. 1993). Studies showed that medical and mental illness have an important impact on an individual's QoL (Dodel et al. 2007;Ervik et al. 2006;Melle et al. 2005;Michalak et al. 2005;Spitzer et al. 1995;Stewart et al. 1989). Investigations also revealed that patients with the same clinical criteria assessed for HRQoL could react and feel quite differently (Guyatt et al. 1993).

In adults with ADHD research about associations between the disorder and HRQoL has been limited (Rimmerman et al. 2005). Clinical trials on psychopharmacological treatment of ADHD in adults primarily have investigated efficacy and safety, and did not include HRQoL as a natural outcome measure (Adler et al. 2006b). The limited number of studies that have investigated HRQoL found younger adults with ADHD to report reduced HRQoL when compared to controls (Adler et al. 2006b;Grenwald-Mayes 2002;Rimmerman et al. 2005). Similiar results have been reported from studies that had investigated HRQoL in children and adolescents with ADHD (Klassen et al. 2004;Matza et al. 2004).

Assessment of QoL and HRQoL can be carried out with a generic instrument that provides a summary of several areas, or a disease specific instrument that extract more specific problems associated with the disorder. In the absence of a disease-specific quality of life instrument for adults with ADHD, Brod and colleagues developed and validated the Adult attention-deficit/hyperactivity quality of life scale (AAQoL[23]), an instrument that was based on an increased awareness of the impact of ADHD symptoms and associated functional impairment on quality of life in adults with the disorder (Brod et al. 2005;Brod et al. 2006;Matza et al. 2007).

[22] HRQoL health-related quality of life
[23] AAQoL adult attention-deficit/hyperactivity quality of life scale

Although short-term intervention studies, lasting not longer than eight weeks, provided some initial evidence that pharmacotherapy significantly improved measures of mental health and ameliorated ADHD symptoms, the impact of long-term treatment on QoL in adults with ADHD so far has not been investigated satisfactory (Adler et al. 2006b). Information on functional impairment and quality of life in middle-aged and older adults with ADHD is scarce.

1.8 Unsolved research issues

Based on what has been presented in the previous chapters of the thesis, several unsolved research issues of treatment and outcome in adults with ADHD in different age groups arises.

Although the efficacy of short-term ADHD pharmacotherapy on the core symptoms of the disorder in adults is well documented, long-term follow-up studies are warranted to investigate the impact of such treatment on outcome (Myhre 2005;Spencer et al. 2004;Torgersen et al. 2008). This is even more necessary as studies of long-term treatment of children and adolescents with ADHD (e.g., MTA[24] study) have reported mixed results (Jensen et al. 2007;Swanson et al. 2007; Weiss et al.1975). Already in the early stages of treatment of ADHD, Weiss et al. (1975) summarized their findings after 3 to 5 years of treatment with stimulant medication in the following way: "*Our impression was that methylphenidate was helpful in making hyperactive children more manageable at home and at school, but did not significantly affect their outcome after 5 years of treatment*" (Weiss et al. 1975). With respect to adults with ADHD the long-term impact of pharmacotherapy on outcome still is unresolved.

The identification of variables associated with better outcomes in adults with ADHD is important for the development of appropriate treatment plans and public health strategies. So far factors such a family history of ADHD, psychiatric comorbidity and psychosocial adversity have been identified as possible predictors of a persistence of ADHD into adulthood (Biederman 2005), but studies showed that outcome primarily seemed to be defined through a cumulative interaction of

[24] MTA Multimodal Treatment Study of Children with ADHD

individual characteristics, family parameters, and treatment (Hechtman 1999). One obvious limitation of these findings is that most studies have been performed in North America with a somewhat different set of social and cultural condtions compared to Non American societies.

Samples of adults with ADHD participating in randomized controlled treatment trials do to a large degree not reflect the variety of patients seen in the clinic (Surman et al. 2010;Weiss et al. 2006). Therefore, more information on treatment outcome in naturalistic samples of adults with ADHD is needed.

Use and persistence of psychopharmacological treatment in adults with ADHD is still an unsolved research issue. From clinical trials high attrition rates have been reported (Myhre 2005;Spencer et al. 2004;Torgersen et al. 2008). Chart reviews on a continuity of MPH treatment in adults with ADHD revealed only short periods of adherence to treatment (Olfson et al. 2007;Perwien et al. 2004). Many of these studies have been performed outside of Europe and do by this reflect the somewhat different structure of society and public welfare system that may have hampered persistence and adherence to treatment than found in Europe.

The issue of a persistence of ADHD into middle-aged and late adulthood has hardly been discussed in the scientific literature (da Silva and Louza 2008;Weiss et al. 2001;Wetzel and Burke 2008). Limited information has been available on course, treatment, and outcome (e.g., impairment and QoL) in these age groups (Barkley 2002;Weiss et al. 2001). With an increased awareness of a lifelong persistence of ADHD, research about how the disorder looks like and what happens in middle-aged and late adulthood is of emerging interest. For example, are the core features of ADHD similar to what has been reported in younger age groups; can ADHD predispose the development of cognitive decline in late adulthood; does ADHD influence physical health and morbidity in late life; how have older adults managed to live with their ADHD symptoms; and can they tolerate and have benefit from treatment with stimulant medication?

According to The Norwegian Prescription Database the number of adults aged 50 to 79 years who had purchased at least one prescription of stimulant ADHD medication during a year, had increased substantially from 2004 to 2008. Whereas a total of 280

subjects in these age groups were registred in 2004, the total number had rised to 738 subjects by 2008, and the largest growth was observed for those between 50 to 59 years of age (Norwegian Prescription Database 2013). Prescription of stimulant medication in Norway is restricted to treatment of ADHD and narcolepsy. Narcolepsy is a rare, underdiagnosed and often untreated condition (Heier et al. 2009;Norwegian Board of Health Supervision 1998). The increase of prescription rates of stimulant medication in these age groups from 2004 to 2008 therefore most probably was a consequence of an increased awareness on and treatment of ADHD in Norway.

As the public awareness of a persistence of ADHD into adulthood at least in some parts of the world is growing, there is an increasing pressure for evaluation and treatment, with an equivalent demand for PCPs[25] to take responsibility for treatment of ADHD (Hinshaw et al. 2011;Pottegard et al. 2012;Schlander et al. 2007;Turgay et al.2012). According to international guidelines, pharmacotherapy for adults with ADHD should be started by a specialist and can be transferred to PCPs for further consultations and control when the patients' condition is stable (National Institute for Health and Clinical Excellence 2008; The Norwegian Directorate of Health 2007). Concerns have been raised about whether or not PCPs are prepared to take on this responsibility (Thapar and Thapar 2002), and research on management of adult ADHD by PCPs has been sparse (Olfson et al. 2013).

Finally, the physician-patient relationship has been found to be important for patients' satisfaction, treatment adherence, and outcome (Adams and Drake 2006). In the field of adult ADHD this issue has not been investigated extensively. For instance, the physician-patient relationship might be particularly vulnerable due to some of the clinical characteristics of the adult patient with ADHD (e.g., being late to or missed appointments, irritability, poor compliance), as well as some concerns about insufficient knowledge and treatment experience about adult ADHD among PCPs (Adler et al. 2009).

[25] PCP primary care physican

2. AIMS

The overall aims of the thesis were

- to study use and persistence of psychopharmacological treatment for ADHD in different age groups of adults with the disorder (addressed in Papers I and III),
- to study the physician-patient agreement on treatment for ADHD (addressed in Paper II),
- to investigate the current functioning and quality of life of adults with AHDH in different age groups (addressed in Papers II and IV), and
- to study to which extent psychopharmacological treatment for ADHD might impact outcome (addressed in Papers I, II, and III).

The thesis is based on two samples of adults with ADHD in different age groups. The younger sample of adults in the *SIBBE* study had a mean age of 36.5 years at follow-up. The older sample of adults in the *Fifty Plus* study had a mean age of 55.8 years when assessed. Results from the *SIBBE* study are presented in Papers I and II, whereas results from the *Fifty Plus* study can be found in Papers III and IV.

In **Paper I** we investigated the long-term outcome of psychopharmacologically treated adults with ADHD in a naturalistic setting. The aims of this study were:

- to investigate current use of ADHD pharmacotherapy,
- to measure ADHD symptomatology and mental health functioning at follow-up,
- to investigate the relationship between time on psychopharmacological treatment and outcome, and
- to identify possible predictors of outcome.

In **Paper II** we primarily studied aspects of psychopharmacological treatment for ADHD as reported by patients and their primary care physicians. The aims of this study were:

- to investigate primary care physician-patient agreement on use and misuse of stimulant medication,
- to investigate primary care physician-patient agreement on nonpharmacological treatment for ADHD, and

- to investigate the agreement between patients' self-report and primary care physicians' clinical judgment of the patients' functioning.

In **Paper III** psychopharmacological treatment of middle-aged and older adults with ADHD was investigated in a relatively large sample of adults 50 years of age and older. The aims of this study were

- to investigate use and persistence of psychopharmacological treatment for ADHD in this age group, and
- to explore the association between current psychopharmacological treatment for ADHD and ADHD symptoms, life satisfaction and psychosocial factors.

In **Paper IV** we investigated the impact of ADHD on quality of life in a sample of adults aged fifty years of age and older. The aims of this study were

- to investigate health-related quality of life and satisfaction with life compared with populations norms, and
- to identify patient characteristics associated with better quality of life.

3. MATERIAL AND METHODS

3.1 The expert teams for hyperkinetic disorder/ADHD

Treatment of adults with ADHD with stimulant medication in Norway officially was not permitted until 1997 (Norwegian Board of Health Supervision 1997). Nevertheless, this did not preclude that as late as in 1996 some Norwegian clinicians could report on a case study of treatment with amphetamine of five adults diagnosed with ADHD and imprisoned for serious crime of violence (Stovner et al. 1996).

In 1997 the Norwegian Parliament unanimously voted that National Health Authorities should consider to establish a competence center at one of the regional hospitals, and to give access to treatment of "*MBD*[26]*-patients*" 18 years of age and older (Standing Committee on Health and Social Affairs 1997). In line with the resolution, National Health Authorities then appointed three regional multidisciplinary part-time working expert teams for hyperkinetic disorder/ADHD to secure assessment, diagnosis and treatment of adults with ADHD with stimulant medications for a period that in the end lasted until spring 2005. Also, the expert teams should assist National Health Services to increase the knowledge and competence on ADHD in adults (Norwegian Board of Health Supervision 1998), and to conduct a follow-up study among those adults with ADHD who had been treated with stimulant medication for a period of at least 24 months (Norwegian Board of Health Supervision 1999). In the regulations given, the National Health Authorities underlined that treatment with stimulant medication (available at that time were immediate release Ritalin®, and an immediate release amphetamine compound called Dexamin®), should be part of an individualized, comprehensive treatment plan (Norwegian Board of Health Supervision 1997;Norwegian Board of Health Supervision 1998). Treatment of adults with ADHD with stimulant medication as scheduled drugs was strongly restricted (i.e., initially limited to a specified pharmacy for an individual patient) (Norwegian Board of Health Supervision 1997;Norwegian Board of Health Supervision 1998).

The diagnoses of adult ADHD by the expert teams were primarily based on written information provided by local specialists (psychiatrist or clinical psychologist)

[26] MBD minimal brain disorder or dysfunction

responsible for the assessment of ADHD, as well as psychiatric comorbidity and substance use. Based on available empirical evidence the expert teames developed and launched clinical guidelines on assessment, diagnosis, and treatment of ADHD in adults. The diagnostic assessment was primarily based on the ICD-10-DCR[27] for hyperkinetic disorder (World Health Organization 1993), which is the official diagnostic system used in Norway. In accordance with National Health Authorities, two adjustments referring to the conceptualization of ADHD in the DSM-IV (American Psychiatric Association 1994) were made: first, acceptance of the primarily inattentive subtype of ADHD as a diagnostic option, and second allowing the presence of comorbid psychiatric disorders as long as the diagnostic criteria for ADHD were fulfilled and the symptoms did not occur exclusively during the course of a comorbid psychiatric condition. The reasons for these adjustments were the necessity to have assessment procedures that were in line with international diagnostic standards on adult ADHD.

Treatment with stimulant medication of adults provided by local specialists (psychiatrist or general practitioner) could only be started when 1) the diagnosis of ADHD was confirmed; 2) safety was secured with respect to medical and psychiatric concerns (e.g. blood pressure, current substance use); and 3) health authorities had licensed its use (Norwegian Board of Health Supervision 1998).

The procedures for the expert teams have been summarized in two main reports (Aanonsen et al. 2000;Aanonsen et al. 2004), and one supplemental report (Aanonsen et al. 2005) to the National Health Authorities. From October 1997 to August 2003, nationwide a total of 2516 applications had been received (Aanonsen et al. 2004). Among these, in 662 cases (24.7 %) the submitted documentation was lacking substantial information, and no diagnostic conclusion could be made. In 182 cases (7.2 %) the expert teams advised against either the diagnosis of ADHD or treatment with stimulant medication. Finally, in 1712 cases (68.1 %) the expert teams approved the diagnosis of adult ADHD and recommended treatment with stimulant medication. By august 2003, a total of 262 adults with ADHD (15.3 % of the 1712 cases) were registred to have been treated with stimulant medication for 24 months or more (Aanonsen et al. 2004).

[27] DCR diagnostic criteria for research

In spring 2005 the system with regional expert teams was replaced by National guidelines for diagnoses and treatment of ADHD (The Norwegian Directorate of Health 2007). Simultaneously, pharmacological treatment of adults with ADHD with stimulant medication was permitted on a more general matter (The Norwegian Directorate of Health 2007). Long-term data on a large number of adults with ADHD that had been collected by the regional expert team for South-Eastern Norway from August 2003 to May 2005 had not been analyzed yet, and constituted by this one of the starting points for the thesis.

3.2 Overview of investigations included in the thesis

In Table 2 a brief overview of the two studies included in the thesis (*SIBBE* and *Fifty Plus*) is presented.

Table 2. Overview of studies included

Variables	**SIBBE***	**Fifty Plus**
Year of data collection	2008-2009	2010
Eligible, n	1080#	251
Response rate n, %	376 (34.8)	166 (66.1)
Included n, %	368 (34.1)	149 (59.4)
Age, mean ± SD[28], years	36.5±10.8	55.8±4.4

*SIBBE= Studie om iverksatt behandling, behandlingsforløp og effektvurdering (Study on initiated treatment, treatment course and treatment evaluation)
16 reported dead at follow-up, and the number of eligible participants has been adjusted to 1080

3.3 The SIBBE study

SIBBE stands as an acronym in Norwegian for "Studie om iverksatt behandling, behandlingsforløp og effektvurdering", and is in English translated to "Study on initiated treatment, treatment course and treatment evaluation". The *SIBBE* study was designed as a two-step questionnaire survey, where adults with ADHD who agreed to participate in the follow-up study were asked for permission to send a survey to the physician responsible for the treatment of ADHD.

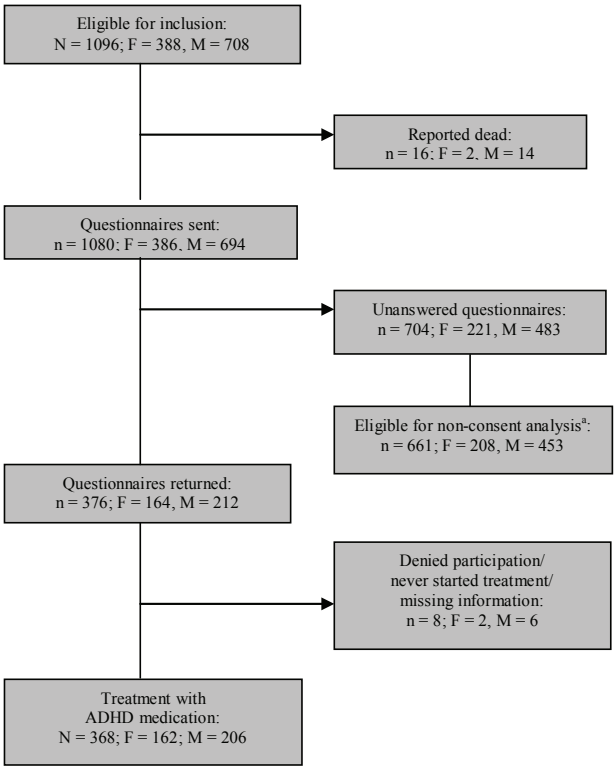
[28] SD standard deviation

3.3.1 Sample of the SIBBE study

Eligible for the *SIBBE* study were 1096 adults from South-East Norway with a confirmed diagnosis of ADHD by the regional expert team for South-East Norway, and a confirmed consent of treatment with stimulant medication from august 2003 to spring 2005. These adults with ADHD had not been included in earlier reports by the expert teams (Aanonsen et al. 2000;Aanonsen et al. 2004). At follow-up, 16 persons were reported dead. We were unable to investigate the cause of death in these cases.

In Figure 1 the study flow is presented (adapted from Paper I).

Figure 1. Study Flowchart*



[a]Insufficient information for 43 subjects
Abbreviations: ADHD=attention-deficit/hyperactivity disorder, F=female, M=male.
*adapted from Lensing et al Four-Year Outcome in Psychopharmacologically Treated Adults With Attention-Deficit/Hyperactivity Disorder: A Questionnaire Survey J Clin Psychiatry 2013:74 (1):e87-e93.

We compared participants (N=368) with non-participants with available information (N=661). The analyses did not reveal statistically significant difference as to

hyperactivity, impulsivity or inattention scores at baseline. Participants were older (at baseline mean age 31.6±10.7 vs[29] 28.8±10.1; T=-4.6, DF=1027, P<0.001), more often females (44.0 % vs 32.0 %; χ^2=16.2, DF=1, P<0.001), and had a slightly higher score on the SCL-90-R[30] depression subscale at baseline (1.6±1.0 vs 1.5±0.9; T=2.1, DF=623, P<0.05) than non-participants. Scores on other subscales and the GSI[31] showed no significant differences between participants and non-participants at baseline. Neither did self-reported ADHD impairment differ between groups.

Sample characteristics of the 368 adults with ADHD included in the *SIBBE* study are presented in Table 3 (adapted from Paper I).

[29] VS versus
[30] SCL-90-R Symptom Checklist 90-Revised
[31] GSI global severity index

Table 3. Population Characteristics of 368 Adults with ADHD at Baseline*

Population Characteristics	Values
Age, mean ± SD, years	31.9 ± 10.7
Gender, n (%)	
Females	162 (44.0)
Males	206 (56.0)
Highest educational level, n (%)	
Junior high school	168 (45.7)
Senior high school	119 (32.3)
College/University	46 (12.5)
Missing	35 (9.5)
Civil status, n (%)	
Single	190 (51.6)
Married/Cohabited	133 (36.2)
Missing	45 (12.2)
Employment, n (%)	
Employed/under education[a]	182 (49.4)
Unemployed/disability pension[b]	157 (42.7)
Missing	29 (7.9)
Subtype ADHD diagnosis, n (%)	
Combined	155 (42.1)
Predominantly Inattentive	132 (35.9)
Predominantly Hyperactive-Impulsive	22 (6.0)
Residual	28 (7.6)
Insecure subtype	31 (8.4)
Diagnosis of ADHD during childhood/adolescence, n (%)	87 (23.6)
One or more comorbid psychiatric disorders at baseline[c], n (%)	224 (60.9)
Substance use	142 (38.6)

[a]Under education: n=82
[b]Disability pension: n=126
[c]Excluding Substance use; Most frequent comorbid psychiatric disorders: mood disorders (n=146); anxiety disorders (n=107); personality disorders (n=44); other psychiatric disorders (n=42)
Abbreviation: ADHD=attention deficit hyperactivity disorder
*adapted from Lensing et al Four-Year Outcome in Psychopharmacologically Treated Adults With Attention-Deficit/Hyperactivity Disorder: A Questionnaire Survey J Clin Psychiatry 2013:74 (1):e87-e93.

3.3.2 Primary Care Physicians (PCPs)

Adults with ADHD who had agreed to participate in the *SIBBE* study were asked for permission to send a survey to the physician responsible for the treatment of ADHD. The vast majority of our sample of 368 adults with ADHD agreed to participate (n=305; 82.9 %). Participants were older (mean age at follow-up was 37.4±11.1 vs

32.8±8.9; *T*=3.6, *DF*=106.1, *P*=0.001), and more often female (88.3 % vs 78.6 %; χ^2=5.9, *DF*=1, *P*=0.015) compared to nonparticipants. Among the 305 participants, a majority of 274 (89.8 %) reported to be treated for ADHD by a PCP, whereas 31 (10.2 %) reported to be treated for ADHD by a specialist. Reports by specialists did not differ substantially from those by PCPs, and have not been included in Paper II.

3.4 The Fifty Plus study

The aim of the *Fifty Plus* study was to investigate use and persistence of pharmacotherapy, and to assess QoL[32] in middle-aged and older adults with ADHD. The study has been carried out in collaboration with the Norwegian ADHD patient organization. The Norwegian ADHD patient organization was established in 1979 and has nearly 10 000 members. The study was designed as an anonymous questionnaire survey among members of the patient organization with a registred diagnosis of ADHD, and aged fifty years and older. To secure anonymity the questionnaire was sent three times to the eligible sample by the patient organization.

3.4.1 Eligible sample of the Fifty Plus study

Altogether 251 members of the patient organization fulfilled the inclusion criteria (e.g., being fifty years of age and older, and registered with a diagnosis of ADHD). More than 50 % of the eligible sample was female (n=140; 55.8 %). The mean age was 55.5±4.8 years (range 50-80 years), and with no statistically significant difference as regards to gender. The majority (n=183, 72.9 %) was settled in the South-Eastern part of the country. According to Statistics Norway by 2013 more than 55 % of the total Norwegian population was settled in the South-Eastern part of the country (Statistics Norway 2013).

3.4.2 Reference samples in the Fifty Plus study

Population samples from Denmark on quality of life and Norway on satisfaction with life served as reference samples (Paper IV).

[32] QoL quality of life

We used the EQ-5D[33] (The EuroQol Group 1990) as a measurement of HRQoL[34]. Unfortunately, population data for this instrument are not available for Norway yet. Therefore recently published Danish EQ-5D data served as a reference sample in our study (Sorensen et al. 2009). The Danish reference sample comprised quality of life data from three population health surveys on 15.700 individuals aged 20-79 years (Sorensen et al. 2009). In our study the reference sample was limited to individuals in the age groups 50-59 years (n=3162; 50.8 % females) and 60-69 years (n=2121; 52.3 % females). Studies have shown that the Nordic countries are quite similar with respect to well-developed health and welfare politics (Wahlbeck et al. 2011).

Population data for satisfaction with life measured with the SWLS[35] (Diener et al. 1985) were adapted from the NorLAG[36] study. NorLAG includes data from 2003-2007 on more than 3.500 individuals 40 years of age and older as well as 15.000 individuals aged 18 years and older from the Norwegian study of life course, generation and gender, which in 2007 was merged with the original NorLAG study (The Norwegian study on life course ageing and generation (NorLAG) 2011).

3.5 Measurements

3.5.1 Diagnostic assessments in the SIBBE study

Assessment of the diagnoses hyperkinetic disorder and ADHD, Combined Type was based on ICD-10-DCR (World Health Organization 1993) and DSM-IV/DSM-IV-TR (American Psychiatric Association 1994;American Psychiatric Association 2000), respectively. For subjects with primarily inattention problems, criteria for ADHD Predominantly Inattentive Subtype in DSM-IV were applied. Baseline diagnostic conclusions were reassessed by checking the inter-rater reliability for two independent raters of records from 54 randomly selected study subjects. Cohen's Kappa values for ADHD combined and predominantly inattentive subtypes were .94 and .87, respectively.

[33] EQ-5D EuroQol 5D
[34] HRQoL health related quality of life
[35] SWLS Satisfaction With Life Scale
[36] NorLAG Norwegian study on life course, ageing and generation

3.5.2 Questionnaires in the SIBBE and the Fifty Plus study

Initially, questionnaire items were evolved from baseline characteristics, research questions, and structured instruments (see Table 4 for detailed information). We used focus- and expert groups during the development and testing of the questionnaires.

Table 4. Overview of main instruments in SIBBE* and Fifty Plus

Instruments	SIBBE	Fifty Plus
General Adult ADD Questionnaire	x	
Adult ADHD Self Report Scale (ASRS) Symptom Checklist	x	
Adult ADHD Self-Report Scale (ASRS v1.1) - Screener	x	x
Symptom Checklist 90-Revised (SCL-90-R)	x	
Mental Health Index-5 (MHI-5)	x	
Sheehan Disability Scale (SDS)	x	
Euroqol-5D (EQ-5D)		x
Satisfaction with Life Scale (SWLS)		x

*SIBBE= Studie om iverksatt behandling, behandlingsforløp og effektvurdering (Study on initiated treatment, treatment course and treatment evaluation)

In the *SIBBE* study adults with ADHD also were asked to report on 21 questions concerning sociodemographic variables including educational and occupational level, pharmacological treatment, misuse of ADHD medication, nonpharmacological and psychosocial treatment for ADHD, treatment outcome and evaluation as well as somatic and psychiatric comorbidity.

Participating PCPs[37] and psychiatrists, responsible for treatment of ADHD, answered nine questions about ADHD treatment that were identical with the patient questionnaire (current treatment with ADHD medication, prescribed daily dosage, reasons for stopping treatment, and nonpharmacological treatment for ADHD). Physicians were asked about mistrust with respect to patients' use of prescribed ADHD medication. Information about treatment of substance use, and treatment with medication other than for ADHD were asked for. Physicians also reported on side effects of treatment with ADHD medication that had lasted longer than for two weeks, including psychosis, suicidal thoughts, and suicidal acts. Finally, they were

[37] PCP primary care physician

asked to rate the current functioning of the adult with ADHD on a five-point scale from 1 (seriously impaired) to 5 (very good).
Participants in the *Fifty Plus* study were asked to answer 35 additional questions concerning sociodemographic factors including educational and occupational level, work motivation and capacity, age when diagnosed with ADHD, pharmacological treatment for ADHD, nonpharmacological treatment for ADHD, substance use, comorbidity, life satisfaction, loneliness, and mastering of every day life. For reasons of comparison, the majority of these items were adapted from the NorLAG[38] protocol (Solem 2003).

(See Appendix for the Norwegian versions of the questionnaires used in the *SIBBE* and the *Fifty Plus* study, respectively).

3.5.3 ADHD symptom scores

3.5.3.1 Baseline assessment in the SIBBE study

The *General Adult ADD Questionnaire* (Amen 1997) is a self-report instrument designed to assess childhood ADHD history, current ADHD symptomatology and associated features. The original form consists of 77 questions. In 2000 the expert teams introduced a comprised version with 29 questions yielding five subscales (inattention, restlessness, impulsivity, organization difficulties and procrastination). Items are scored on a five-point scale from 0 (never) to 4 (very frequently). From 1997 to 2003 primarily this instrument was used to assess baseline ADHD symptomatology. The instrument was translated into Norwegian by the expert teams, but has never been officially validated in Norway.

A pilot version of the WHO *Adult ADHD Self-Report Scale* (*ASRS*) *Symptom Checklist* (World Health Organization and Workgroup on Adult ADHD 2003) replaced the *General Adult ADD Questionnaire* from 2004. The *ASRS* is a self-report instrument designed to assess current ADHD symptoms in adults. Basically, the 18 items of the *ASRS* are the DSM-IV criteria for ADHD, but have been slightly modified to fit for adults. The instrument consists of 9 items assessing inattention (part A), and 9 items assessing hyperactivity and impulsivity (part B). Items are

[38] NorLAG Norwegian study of life course, ageing and generation

scored on a five-point scale from 0 (never) to 4 (very often), giving a sum score ranging from 0-54. In the pilot version the following scoring recommendation is given; 0-16 points: the patient is not likely to have ADHD in adulthood; 17-23 points: the patient is likely to have ADHD; and 24 points or more on either part A or B: the patient is highly likely to have ADHD in adulthood. The instrument was translated into Norwegian by the expert teams, but has never been officially validated in Norway. The wording of the items in the pilot version is not substantially different from the *ASRS Self-Report Scale (ASRS v1.1) Symptom Checklist* (Adler et al. 2006a;Kessler et al. 2005b), which has been used extensively in clinical practice and research.

3.5.3.2 Follow-up assessment in the SIBBE and the Fifty Plus study

At follow-up, current ADHD symptoms were assessed with the WHO *Adult ADHD Self-Report Scale (ASRS v1.1)–Screener* (Kessler et al. 2007). The ASRS Screener consists of six of the eighteen questions of the WHO ASRS Self-Report Scale (ASRS v1.1) Symptom Checklist that were found to be most predictive of symptoms consistent with ADHD. Four of the six items are measuring inattention, and two items are measuring hyperactivity/impulsivity. Symptom frequency is rated on a five-point scale ranging from 0 (never) to 4 (very often). Scores were summed with a cutoff score of 14 (Taylor et al. 2011). The ASRS Self-Report Scale (ASRS v1.1) Symptom Checklist has not been officially validated in Norway. The Norwegian Directorate of Health has been responsible for the translation of the official Norwegian version of the ASRS v1.1, and ensured that this was carried out in line with the specifications by the copy right holders (i.e., forward and backward translation, test period and wording adjustment by experts). The ASRS v1.1 has been used both in clinical practice and research (Halmoy et al. 2010;Halmøy 2011;Rasmussen et al. 2001).

3.5.4 Mental health

3.5.4.1 Baseline assessment in the SIBBE study

The *Symptom Checklist 90-Revised (SCL-90-R)* (Degoratis 1994) is a screening instrument designed to measure general psychiatric symptomatology. The SCL-90-R

consists of 90 statements scored on a five-point scale from 0 (not at all) to 4 (very much). Scoring yields 9 subscales (somatization, obsessive-compulsive, depression, anxiety, phobic anxiety, hostility, interpersonal sensitivity, paranoid ideation, and psychoticism) and a Global Severity Index (GSI), which is the mean of all statements. Higher scores indicate more symptomatic distress. The validated Norwegian version of the SCL-90-R (Vassend et al. 1992) was used in the study.

3.5.4.2 Follow-up assessment in the SIBBE study

The *Mental Health Index-5* (*MHI-5*) is one of eight subscales of the Short Form 36® (Ware, Jr. et al. 2000). The five items of the *MHI-5* are "Have you ever been a nervous person?", "Have you felt so down in the dumps that nothing could cheer you up?", "Have you felt calm and peaceful?", "Have you felt downhearted and blue?", and "`Have you been a happy person?". Items are scored on six possible alternatives from "all of the time" to "not at all" with a score between 5 and 30, which is transformed linearly to a scale from 0 to 100. Higher scores indicate better mental health. The SF-36 has been validated for the Norwegian population (Loge and Kaasa 1998).

The *Sheehan Disability Scale (SDS)* (Leon et al. 1997) is designed to assess mental-health related impairment. The SDS consists of three self-rated items regarding work, social, and family impairment because of emotional symptoms: "To what extent have emotional symptoms disturbed your (work, social, family) life in the past week?" The items are rated from 0 to 11, with 0 (not at all), 1–3 (mildly), 4–6 (moderately), 7–9 (markedly), 10 (extremely), and 11 (not applicable). An SDS total score of ≥5 has been found to be associated with increased risk of mental health-related functional impairments. The Sheehan Disability Scale has not been validated for the Norwegian population. On the other hand has the scale been used in several research studies (Irgens et al. 2012;Tjemsland and Soreide 2001).

3.5.5 Quality of Life assessment in the Fifty Plus study

The *EQ-5D* is a generic standardized health-related quality of life self-report instrument developed by the EuroQol Group (The EuroQol Group 1990). The *EQ-5D*

consists of five descriptive dimensions (mobility, self-care, usual activity, pain/discomfort and anxiety/depression) and a visual analogue "thermometer" scale (*EQ-VAS*). On each of the five dimensions subjects are asked to judge their current health state on one of three possible levels: "no", "some" or "extreme" problems, which is scored 1, 2, and 3, respectively. On the *EQ-VAS* subjects are asked to indicate current health condition on a scale from 0 (worst imaginable health state) to 100 (best imaginable health state). Recently, the EuroQol Group gave new definitions for the *EQ-5D* nomenclature and changed the designation of the version used in our study to EQ-5D-3L (EuroQol Group 2013a). For the sake of clarity the former abbreviation EQ-5D will be used throughout the thesis. The instrument has been translated into Norwegian (EuroQol Group 2013b). Norwegian population data are not available yet. Therefore, recently published Danish EQ-5D data were used as a reference sample in the *Fifty Plus* study (Sorensen et al. 2009).

The *Satisfaction with Life Scale* (SWLS) (Diener et al. 1985) is a five-item self-report questionnaire measuring the satisfaction with one's life as a whole. The five items are: "In most ways my life is close to my ideal," "The conditions of my life are excellent," "I am satisfied with my life," "So far I have gotten the important things I want in my life" and "If I could live my life over, I would change almost nothing." The original version of this instrument uses a seven-point response scale. We used a five-point response scale that ranged from 1 (totally disagree) to 5 (totally agree), giving total scores that ranged from 5 (extremely dissatisfied) to 25 (highly satisfied). With the seven-point scale, a total score of 20 is defined as neutral (Diener 2012), whereas we set the equivalent score on the five-point scale at 15. The SWLS has been translated into Norwegian. Although so far no Norwegian validation data are available, the reliability and validity of the SWLS has been proven by extensive research (Vittersø 2009).

ADHD-related improvement during psychopharmacological treatment was assessed with a self-reported improvement question *(SRIQ*[39]*)* (ie, "Have you experienced improvement during treatment for ADHD?"). The question is scored on a ten-point visual analog scale from 0 (no) to 1-3 (little), 4-6 (moderate), 7-9 (much) to 10 (very great) improvement. The question has not been used previously in research.

[39] SRIQ self-reported improvement question

3.6 Statistics

In the descriptive part of the studies, chi-square statistics were used when assessing pairwise associations between categorical variables. Associations between binary and continuous variables were analyzed with independent samples t-test or one-way ANOVA. Scheffé's post-hoc analysis was performed to assess group differences whenever appropriate. Associations between continuous variables were analyzed using Pearson correlation coefficients, whereas Spearman rho was used to calculate correlation coefficients between categorical and continuous variables. Linear and binary logistic regression analyses were performed to identify factors associated with better outcome.

In the *SIBBE* study (Papers I and II) the level of significance was 5 %. To increase the probability to report true findings the level of significance was set to 1 % in the anonymously performed *Fifty Plus* study (Papers III and IV).

In Paper I (*SIBBE* study) Cohen's Kappa was used to estimate the inter-rater reliability for diagnostic categories.

In Paper II (*SIBBE* study) the kappa statistics was used to assess agreement between PCPs' and patients' reports on selected variables. A kappa-value of 1 indicates complete agreement, whereas a kappa-value of 0 indicates that the agreement is not more than expected by chance (Kirkwood and Sterne 2011). According to Landis et al. (1977), kappa-values greater than .81 represent an almost perfect agreement, values between .61-.80 substantial agreement, values between .41-.60 moderate agreement, and values of .40 and below represent fair-to-poor agreement (Landis and Koch 1977). Standard errors for kappa-values were calculated using bootstrapping. Variables with empty cells or where one cell accounted for more than 90 % of the distribution were excluded from the analysis. PCP-patient agreement on continuous variables was analyzed with a paired samples t-test.

In Paper IV (*Fifty Plus* study) the percentages in the Danish EQ-5D sample were adjusted for the age and gender distribution of the ADHD group as recommended by Hjermstad (Hjermstad et al. 1998). A one-sample non-parametric binominal test was then used to analyze for statistically significant differences.

Statistical analyses were performed with the predictive analytic software PASW Statistics 18.0 for Windows (IBM, Armonk, NY). The PhD candidate under supervision by a statistician did all statistical analyses.

4. ETHICS

4.1 The SIBBE study

The *SIBBE* study was approved by the Regional Ethic Committee for South-East Norway and the Norwegian Data Inspectorate. An informed consent based on detailed written information in line with research ethical standards was obtained from all participants in the follow-up part of the *SIBBE* study. Those, who agreed to participate in the patient-physician part of the study, had to provide updated information about the physician responsible for the treatment for ADHD. The physician questionnaire contained detailed information about the study, and information about the patients' agreement to participate.

A postal questionnaire was sent the eligible sample of adults with ADHD. Based on previous research a pre-notification (a lottery-ticket of a value of 25 Norwegian Kroner) was given in the patient questionnaire (Edwards et al. 2007). One reminder, without any further pre-notifications, was sent. Participating physicians could order a scientific book about ADHD on request as compensation for the time they had used with the questionnaire.

Questionnaires could be answered either by postal return or by choosing a secured web-based solution with a personal code.

4.2 The Fifty Plus study

The Data Protection Officer at Oslo University Hospital approved the *Fifty Plus* study. The Regional Ethic Committee for South-East Norway had concluded that this was satisfactory. The study was anonymous, and therefore no further consent was required.

The questionnaire was sent to the eligible sample by the patient organization.

5. RESULTS

5.1 Paper I

Four-year outcome in psychopharmacologically treated adults with Attention-Deficit/Hyperactivity Disorder: a questionnaire survey.

Paper I is a cross-sectional questionnaire survey that was performed among adults with ADHD, diagnosed according to ICD-10/DSM-IV and approved for pharmacotherapy during 2003-2005. Of an eligible number of 1080, 371 subjects (34.4 %) agreed to participate, and 368 of these reported having ever been treated with ADHD medication. Baseline characteristics and self-reported outcome was studied by duration of psychopharmacological treatment. Primary outcome measures were the ASRS-Screener (ADHD symptoms) and the MHI-5 (mental health). Based on cutoff scores for these instruments, two groups (favorable outcome versus others) were created to study possible predictors of outcome status.

We found a high attrition rate, but self-reported baseline ADHD symptoms and impairment did not differ between participants and non-participants. The mean observation time was 4.5 (3.5-6.0) years, and the mean age at follow-up was 36.5 years. Altogether 270 participants (73.4 %) had been treated for more than 24 months. They reported better outcome on all measures compared to those treated for less than 24 months (mean values: ASRS-Screener: 12.8 vs 15.3; MHI-5: 63.7 vs 56.7). We found that the favorable outcome group consisted of 79 participants (21.5 %). Among sample characteristics comorbidity at baseline predicted poorer outcome.

5.2 Paper II

Adults with ADHD: use and misuse of stimulant medication as reported by patients and their primary care physicians.

Paper II is a cross-sectional survey that was administered among adults with ADHD and the primary care physicians responsible for their ADHD treatment. The kappa statistics assessed physician–patient agreement on ADHD treatment variables. The eligible sample consisted of 274 patients with confirmed current or previous

psychopharmacological treatment for ADHD and the physicians responsible for their treatment.

We received 159 questionnaires (58.0 %) with sufficient information from both sources. There were no significant differences between participants and nonparticipants (N=115) on ADHD sample characteristics. Participants' mean age was 37.6 years, and 75 of participants (47.2 %) were female. We found high agreement for current pharmacological treatment of ADHD, current and last ADHD drug prescription, treatment of substance use, and misuse of stimulant medication. Agreement for nonpharmacological treatment of ADHD and treatment termination because of side effects was low. A minority of participants from both sources reported misuse of stimulant medication. There was a moderate correlation between the physicians' clinical judgment and patients' self-report on current functioning. We concluded that primary care physicians could safely undertake pharmacological treatment of adults with ADHD.

5.3 Paper III

Psychopharmacological treatment of Attention-Deficit/Hyperactivity Disorder in adults aged 50+: an empirical study.

Paper III is a cross sectional anonymous survey that was administered to adults with ADHD 50 years of age and older. Eligible for the study were 251 members of a National ADHD patient organization, and 149 (59.4 %) with sufficient information were included. Participants on medication for ADHD were compared with those not on medications.

Mean age of participants was 55.8 years, and mean age when diagnosed with ADHD was 50.3 years. We found that 95 participants (63.8 %) reported current psychopharmacological treatment for ADHD, 36 (24.2 %) had stopped psychopharmacological treatment, and 18 (12.0 %) were psychopharmacologically treatment naive for ADHD. Those currently being treated psychopharmacologically for ADHD reported significantly improved attention relative to the two currently nonmedicated groups ($p<0.01$). Among examined sample characteristics (including current psychopharmacological treatment for ADHD), employment was associated

with a better outcome (OR[40]=3.3, p=0.006). We concluded that the majority of adults aged 50+ with ADHD in this study reported regular pharmacotherapy for ADHD. Participants currently receiving psychopharmacological treatment for ADHD reported better attention than those not receiving pharmacotherapy. Employment was associated with more favorable outcomes.

5.4 Paper IV

Quality of life in adults aged 50+ with ADHD.

Paper IV is a cross sectional anonymous survey that was administered to adults with ADHD 50 years of age and older. Eligible for the study were 251 members of a National ADHD patient organization, and 148 (59.0 %) with sufficient information were included. Quality of life was assessed with EuroQol (EQ-5D) and the Satisfaction with Life Scale (SWLS). Age-matched Danish and Norwegian population samples served as reference groups.

We found that the mean age of participants was 55.7 years, and the mean age when diagnosed with ADHD was 50.2 years. The mean ASRS-Screener score was 15.2. Adults with ADHD reported significantly reduced health-related quality of life and reduced satisfaction with life compared to population norms. Non-employment and severe ADHD were associated with poor quality of life. We concluded that the negative impact of ADHD persists into late adulthood.

[40] OR odds ratio

6. DISCUSSION

6.1 Discussion of the main findings

6.1.1 Use and persistence of psychopharmacological treatment for ADHD

Despite an observation time of more than four to five years, the majority of our adults with ADHD (more than 60 %) reported current pharmacological treatment for ADHD. The findings were strengthened by the high levels of agreement between reports from PCPs[41] and those from their patients on current and terminated pharmacotherapy for ADHD.

One of the main challenges in treatment is that "*drugs don't work in patients who don't take them*" (Osterberg and Blaschke 2005). For instance in psychiatry, nonadherence has been found to be associated with poorer outcomes, including increased rates of hospital admissions and mortality (Chapman and Horne 2013). In the field of ADHD recent investigations showed that when treated and untreated samples were compared, improved long-term outcomes for those who had been treated were found (Arnold et al. 2013;Shaw et al. 2012).

Research has shown that treatment persistence typically one year after treatment start for ADHD is challenged by critical viewpoints to treatment and increased forgetfulness (Eichlseder 1985). Difficulties in adherence with drug treatment over time have been reported frequently in adults with ADHD (Adler and Nierenberg 2010;Sitholey et al. 2010). Chart review studies (McCarthy et al. 2009;Olfson et al. 2007;Perwien et al. 2004), and open label safety and efficacy studies (Adler et al. 2008;Adler et al. 2011;Biederman et al. 2005b) showed that most adults used their ADHD medication for less than six months.

Persistence of psychopharmacological treatment for ADHD generally is less consistent in clinical than research settings (Miller et al. 2004;Naidoo et al. 2013). This is in line with findings from other fields in medicine where treatment persistence has been shown often to decline dramatically over time (Osterberg and Blaschke 2005). Although there is a strong scientific evidence for the efficacy of psychopharmacological treatment of ADHD in adults (Fredriksen et al. 2013;Huang

[41] PCP primary care physician

and Tsai 2011;Kooij et al. 2010;Retz et al. 2011;Santosh et al. 2011;Wilens et al. 2011), high rates of non-adherence (64 % to 80 %) five years after treatment start in ADHD samples have been reported (Adler and Nierenberg 2010;Winterstein et al. 2008). Interestingly, a recent European chart review study reported rates of treatment presistence in line with our findings (The National Board of Health and Welfare (Socialstyrelsen) 2012).

Several factors may have contributed to our results. One of these probably has been access to improved dosing schedules, e.g., single dosing once a day that has been shown to contribute to increased adherence (Osterberg and Blaschke 2005). Among participants in the *SIBBE* study who reported current psychopharmacological treatment for ADHD, the majority used long-acting MPH[42]. They reported better treatment adherence than the group treated with short-acting methylphenidate. Similar results have been published recently where increased use of extended-release formulations of MPH predicted longer treatment duration in a sample of adults with ADHD and high degree of comorbidity (Torgersen et al. 2012). Also, a recent chart study from Denmark found that adults aged 50+ with ADHD were more adherent to pharmacological treatment than their younger counterparts (Pottegard et al. 2013).

The physician-patient relationship has been identified to be another important factor for long-term treatment adherence (Chapman and Horne 2013;Osterberg and Blaschke 2005;Vermeire et al. 2001). We found high levels of agreement for current pharmacological treatment of ADHD, current and last ADHD drug prescription, treatment of substance use, and misuse of stimulant medication between PCPs and their patients. According to national guidelines, psychopharmacological treatment of adults with ADHD included in our study had to be started by local specialists (psychiatrists or general practitioners) (Norwegian Board of Health Supervision 1998;The Norwegian Directorate of Health 2007). Initial findings from the MTA[43] study after 14 months of treatment showed that treatment by specialists was superior to community treatment (The MTA Cooperative Group 1999a), and it recently has been suggested that "*the techniques for medication initiation used by specialists may be one reason that specialist care leads to increased duration of use over time*" in treatment of ADHD (Charach and Fernandez 2013). A qualitative study on

[42] MPH methylphenidate
[43] MTA Multimodal Treatment Study of Children with ADHD

impairment, service provision and clinical management of adult ADHD underlined the importance of qualified guidance by a specialist on treatment adjustments and follow-up for adherence (Matheson et al. 2013).

Reimbursement and distance to health care facilities are other important aspects associated with increased adherence to treatment (Osterberg and Blaschke 2005;Sabate 2003). Nordic welfare systems are characterized by access to equal treatment conditions, the availability of specialists throughout the country and state payment for necessary medical treatments (Wahlbeck et al. 2011;Zoega et al. 2011).

Although we found high rates of use and persistence of treatment over time, we did not assess therapy bouts in particular. Studies have revealed that up to 45 % of patients with ADHD had one or more therapy bouts during treatment for the disorder (Bahmanyar et al. 2013;Miller et al. 2004).

6.1.2 ADHD symptomatology and current functioning

We found inconsistent results with respect to ADHD symptomatology. On one hand, adults currently treated with ADHD medication in the *SIBBE* study (the younger adult ADHD sample) reported significantly lower ADHD symptomatology when measured with the ASRS Screener compared to those unmedicated for the disorder. On the other hand, in the *Fifty Plus* study no statically significant differences in the ASRS Screener mean scores between treatment groups were found, although those currently treated with ADHD medication reported significantly better attention than those unmedicated for the disorder. The current functioning in both samples was significantly decreased when compared to normal controls and population norms. Only a minority of participants reported levels of ADHD symptomatology and current functioning in line with remission.

Our findings of a significant difference between treatment groups for inattention but not for hyperactivity and impulsivity are in line with previous research (Biederman et al. 2000;Faraone and Glatt 2010;Wilens et al. 2002;Willcutt et al. 2012). The inconsistent results with respect to the ASRS Screener mean scores need some further considerations.

In the *SIBBE* study more than 55 % in the currently treated group had an ASRS Screener score below cutoff, whereas the corresponding number in the off-medication group was 35 %. These results were well in line with reports from short-term efficacy studies of ADHD pharmacotherapy on core symptoms in adults (Faraone et al. 2004;Fredriksen et al. 2013;Santosh et al. 2011;Wilens et al. 2011). Open label studies of use of stimulant medication in adolescents and adults with ADHD lasting up to 24 months have, despite high attrition rates, underpinned these findings (Adler et al. 2011;Biederman et al. 2005b;Buitelaar et al. 2011b;Wilens et al. 2005). Similar results of treatment with stimulant medication on ADHD core symptoms have been reported in some longer lasting follow-up studies (Bejerot et al. 2010;Torgersen et al. 2012;Wender et al. 2011). Neurobiological research showed that increase of dopamine enhancement in specific brain areas was associated with response to long-term treatment with MPH (Volkow et al. 2012). This may secondary be followed by an upregulation of dopamine transporters, and can result in further decreases of dopaminergic signaling when unmedicated for shorter periods of time (Wang et al. 2013). Thus, based on these neurobiological research findings one could argue for continuous pharmacotherapy over time for the disorder.

In the *Fifty Plus* study the mean ASRS Screener scores for all three-treatment groups were above the cutoff of 14, and no statistically significant differences were observed between groups. The percentage of participants who had an ASRS Screener score below the cutoff (34 %) was much lower than in our younger sample of adults (*SIBBE* study). Overall, our results did not comport with a previous report of treatment outcomes on core symptoms being similar to those seen in younger adults with ADHD (Manor et al. 2011).

One possible explanation could be related to the instrument itself. The ASRS Screener was originally developed to detect symptoms of ADHD in adults aged 18–44 years (Kessler et al. 2005b). To the best of our knowledge, the applicability of this instrument in adults older than 44 years of age has yet to be validated.

Another explanation, somewhat contrary to our findings from the younger sample of adults with ADHD, could be that there is no significant long-term advantage of pharmacotherapy for ADHD relative to other therapies or no therapy in middle-aged and older adults. Interestingly, long-term follow-up of children with ADHD showed

improvement on ADHD and associated symptoms from baseline, with initial differences in outcomes between treatment strategies (such as pharmacotherapy and behavior modification) disappearing over time, as shown in the Multimodal Treatment Study of Children with ADHD (MTA study) (Molina et al. 2009).

Age-related changes in the dopaminergic system, such as the decreased availability of dopamine transporters and dopamine receptors when getting older, must also be seen as a possible explanation. This downregulation of the dopamine system may reduce the efficacy of treatment with stimulant medications (Volkow and Swanson 2003). Our sample of adults' aged 50+ with ADHD consisted of more women than men. Research has shown that after menopause the availability of dopamine receptors is higher than in men at the same age (Kaasinen et al. 2002). Hence, a more balanced gender distribution probably would have revealed an even worse outcome for those currently receiving medication.

The timing of treatment onset could be a possible explanation as well, as those who are diagnosed with ADHD later in life do not respond as strongly to pharmacological treatment as those who are diagnosed earlier (Dalsgaard et al. 2013;Gjervan et al. 2012a;Matheson et al. 2013).

We found that adults with ADHD in different age groups reported significantly decreased current functioning when compared to normal controls. Early investigations in the field of ADHD showed that hyperactives who were considered to be clearly drug responders even after treatment with stimulant medication for more than three years in young adulthood functioned significantly worse than their matched controls. Rather, their level of functioning in most domains was similar to untreated hyperactives (Hechtman et al. 1984a). Both efficacy and long-term effectiveness studies (e.g., MTA-study) have revealed only small improvements of psychopharmacological treatment beyond the core symptoms of the disorder (Brown et al. 2005;Buitelaar et al. 2011b;Case 2011;Durell et al. 2013;Langberg and Becker 2012;Marcus and Durkin 2011;Molina et al. 2009).

PCPs in our study rated the current functioning of their ADHD patients as neither impaired nor good. These adults with ADHD reported elevated SDS[44] scores after more than 4.5 years of follow-up, which also has been found in a four-year long-term, open label study of adults with ADHD treated with atomoxetine (Adler et al. 2008).

We found an association between symptoms of inattention and reduced function in everyday activities. In adults with ADHD symptoms of inattention have been found strongly associated with functional impairment and occupational outcome (Gjervan et al. 2012a;Szuromi et al. 2013;Weiss et al. 2010). Whereas some reported symptoms of impulsivity to have a strong impact on functional impairment (Szuromi et al. 2013), others found that the relationship between ADHD inattentiveness and occupational outcome was completely moderated by emotionional distress and impairment in social functioning (Gjervan et al. 2013).

In our study only a minority of participants (21.5% in the *SIBBE* study, and 19.1% in the *Fifty Plus* study) reported a level of ADHD symptomatology and current functioning that could be classified as remission, i.e., loss of diagnostic status and optimal functioning as a proposed goal for treatment (Ramos-Quiroga and Casas 2011;Steele et al. 2006;Weiss et al. 2006). Unfortunately, these results correspond well with similar rates of remission from follow-up studies (Miller et al. 2004;Steele et al. 2006), and underline the persistent negative impact of the disorder.

6.1.3 Quality of Life (QoL) in adults with ADHD

In our study adults with ADHD in different age groups reported significantly reduced quality of and satisfaction with life when compared to population norms. Ongoing psychopharmacological treatment did not result in statistically significant improvements in current functioning and satisfaction with life when compared to unmedicated groups.

Assessment of QoL was performed several years after a diagnostic conclusion of ADHD, and in most cases after a longer period of time with psychopharmacological treatment for ADHD with stimulant medication. The results differ somewhat from

[44] SDS Sheehan Disability Scale

previous reports of a positive short-term impact of medication on QoL in younger adults with ADHD who primarily had been treated with atomoxetine (Adler et al. 2006b;Agarwal et al. 2012;Coghill 2010;Weiss et al. 2010). Recent research showed that childhood ADHD, even in those who no longer meet criteria for the disorder, was associated with educational, occupational, and economic disadvantages when compared to controls (Klein et al. 2012). Increased awareness of the persistence of ADHD into adulthood might be a risk for stigmatization related to ADHD with impact on QoL and life satisfaction (Fuermaier et al. 2012;Lebowitz 2013;Mueller et al. 2012). On the other hand, it also has been reported that some can achieve improvement of QoL despite an unchanged symptom profile (Bastiaansen et al. 2005).

Our results showing increased problems with physical activities in middle-aged and older adults with ADHD correspond well with a recent review that found ADHD to be associated with worse physical outcomes (Nigg 2012). Studies of middle-aged and older adults showed that ADHD symptomatology was associated with increased health problems (Bernardi et al. 2012;Das et al. 2012;Guldberg-Kjar and Johansson 2009;Manor et al. 2011;Semeijn et al. 2013a). Adults with ADHD in different age groups reported significantly higher rates of asthma, migraine headaches, obesity, and cardiovascular disease when compared to controls (Cortese et al. 2013;Fasmer et al. 2011a;Fasmer et al. 2011b;Manor et al. 2011;Semeijn et al. 2013a). Whereas some have suggested that a less healthy lifestyle (e.g., more risk taking and impulsive behavior) may have implications for health status and increased risk for mortality (Barkley 2002;Barkley et al. 2008), one of the longest follow-up studies of childhood ADHD into adulthood so far (33 years of follow-up) found that in particular those with a comorbidity of CD[45]/APD[46] had elevated risk taking behavior as adults (Ramos Olazagasti et al. 2013). Significantly increased risk of mortality was reported in a prospective follow-up study in younger adults with ADHD (Barbaresi et al. 2013). On the other hand, a recent investigation among older adults did not find that lifestyle was a mediator of the association between ADHD and physical health (Semeijn et al. 2013a). Further studies on the impact of ADHD on physical health outcomes are warranted.

[45] CD conduct disorder
[46] APD antisocial personality disorder

We found that psychiatric comorbidity and co-occurring disorders had a negative impact on the current health condition. In a study on HRQoL[47] in younger adults with ADHD (69.7 % men; mean age 37.0 years, 67.9 % ADHD, combined type), Adler and colleagues (2006) found them to report only slightly above mean scores on physical subscales, but significantly below mean scores on mental subscales of the Short Form 36® (SF-36) compared to population norms (Adler et al. 2006). An association between anxiety/depression and ADHD symptomatology in middle-aged and older adults has been reported (Das et al. 2012;Michielsen et al. 2013), and a recent investigation found persistent ADHD and co-occurring anxiety/depression to mediate poorer quality of life outcome in adulthood (Yang et al. 2013).

Adults with ADHD in our study were significantly less satisfied with life compared to age- and gender-matched controls. This has also been reported in other studies (Biederman et al. 2006a;Gudjonsson et al. 2009). We found a significant negative correlation between ADHD symptom severity and SWLS[48] total score. Likewise a significant negative association between ADHD symptoms and subjective well-being was reported in a sample of middle-aged adults (Das et al. 2012).

Ongoing psychopharmacological treatment for ADHD did not result in statistically significant differences in current satisfaction with life when compared to those unmedicated. Although available characteristics did not show differences between groups in our study, those who were currently taking ADHD medications could have been more impaired in other important areas of life, and those symptoms might have been ameliorated by their psychopharmacological treatment.

6.1.4 Relationship between time on treatment and outcome

Taking recent findings on long-term treatment into account (Bejerot et al. 2010;Wender et al. 2011), we in the *SIBBE* study drew a line at 24 months of treatment or less on one hand and more than 24 months on the other to study the impact of time on treatment on outcome.

[47] HRQoL health related quality of life
[48] SWLS Satisfaction With Life Scale

We found that those treated for more than 24 months showed significantly more favorable outcomes when compared to the group treated for 24 months or less. Our results provide some evidence that treatment of adults with ADHD in many cases probably should be continued for more than two years.

For patient and doctor it is important to know for how long medication treatment for ADHD should be continued after an initial and satisfactory response to pharmacotherapy has been established. Studies showed that the amount of clinical response over the first six to nine months of treatment with stimulant medication, but not after six weeks, predicted adherence to treatment at two years in adults with ADHD (Bejerot et al. 2010). Others have found that use of extended-release formulations of MPH was associated with longer treatment duration, whereas psychiatric comorbidity (e.g., APD and SUD[49]) was associated with shorter duration of stimulant treatments in adults with ADHD (Torgersen et al. 2012).

More information about predictors of non-adherence and placebo response is valuable. Variables such as higher educational level, shorter time since ADHD was diagnosed, and female sex have been identified as possible predictors of non-adherence (Kooij et al. 2013). On the other hand have a higher severity of ADHD symptoms, younger age, shorter time since ADHD was diagnosed, and lower educational level been found to be possible predictors for placebo response (Buitelaar et al. 2012). Studies also showed that adults with ADHD often adhere to prescribed medication based upon their own opinions, and when it is perceived as needed (Brod et al. 2012;Matheson et al. 2013).

Taken the diversity of ADHD patients into consideration (Powell et al. 2011;van de Loo-Neus GH et al. 2011) at this point of time, no general conclusions on the relationship between time on treatment and outcome for adults with ADHD can be drawn. For some adults with ADHD outcome possibly could be a marked improvement in ADHD symptoms and social functioning after treatment with MPH (Wender et al. 2011). For others outcome probably could be less than a small reduction of ADHD symptoms and small functional improvements (Safren et al. 2005). From a patients' perspective, access to guidance from experienced clinicians

[49] SUD substance use disorder(s)

(Matheson et al. 2013), and to meet a person who believe in them and make them feel worthwhile and optimistic about their future (Hechtman 1991) seem to be important ingredients for treatment adherence and outcome.

6.1.5 Treatment of adult ADHD by primary care physicians (PCPs)

In our study on use and misuse of stimulant medication as reported by patients and their PCPs, we found that they agreed on pharmacological, but not the nonpharmacological treatments given. PCPs and their patients also agreed on patients' current functioning, and both reported low levels of misuse of stimulant medication. Although we did not in particular investigate these topics in the *Fifty Plus* study, it is worth mentioning that in almost 60 % of cases PCPs prescribed the drugs for ADHD.

Our results on high levels of PCP-patient agreement about current psychopharmacological treatment for ADHD, and current and past prescription of stimulant medication are in line with studies that reported high levels of physician-patient agreements for drug prescription, appointments, and patient referrals to other services (Braddock, III et al. 1999;Hooper et al. 2005).

We found low levels of PCP-patient agreement for treatment cessation because of side effects and lack of efficacy. Studies have shown that physicians often do not explore whether patients have understood and accepted the rationales behind doctors' treatment decisions (Braddock, III et al. 1999). Recently published studies found that treatment cessation was often the patient's own choice, made without informing the physician (Matheson et al. 2013;McCarthy et al. 2013). These findings underscore the need for better physician-patient relationships, for example in shared-decision making (Adams and Drake 2006;Charach and Fernandez 2013). The concept of shared-decision making is based on the physicians' expertise, and the patients' and the physicians' preferences for treatment, and presuppose that both parties are willing to share the information that is needed to build a consensus on preferred treatment, and how to implement the latter (Charles et al. 1997). Recent investigations into the treatment of children with ADHD found shared-decision

making a promising approach, but one that required further study (Brinkman et al. 2011;Brinkman et al. 2013;Fiks et al. 2011;Moldavsky and Sayal 2013).

The level of PCP-patient agreement for nonpharmacological and psychosocial treatment of ADHD in our study was low. Studies have shown that physicians and patients often disagree about whether counseling and social support were provided during consultations, and unmet patient expectations were reported frequently (Hooper et al. 2005;Matheson et al. 2013;Rohrbaugh and Rogers 1994).

We found a much lower frequency of self-reported misuse and diversion of stimulant medication than reported previously (Kaye and Darke 2012;Rabiner 2013;Torgersen et al. 2013). These results probably can best be explained by the fact that according to current guidelines (National Institute for Health and Clinical Excellence 2008;The Norwegian Directorate of Health 2007), adults with ADHD should not be transferred to PCPs until their condition is stable. This strategy seems even more appropriate as a recently published study on trends in office-based treatment of adults with stimulant medication in the USA showed a significant increase in stimulant prescriptions in cases without a diagnosis of ADHD, and in particular among visits to nonpsychiatrists physicians (Olfson et al. 2013). A European study on prescription rates of central stimulant medication revealed that a substantial percentage of adults with ADHD (30 %) not only were treated with several scheduled drugs at the same time, but in addition different physicians prescribed these. The in depth analysis showed that these adults more often were prescribed short acting MPH, and with substantially higher mean daily dosages than the rest of the sample (The National Board of Health and Welfare (Socialstyrelsen) 2012).

We found moderate correlations between patients' self-reported current functioning and their physicians' clinical judgment of this. Overall, the majority of participants did still report significant ADHD symptoms and impaired current functioning. Although we concluded that psychopharmacological treatment of adults with ADHD can be safely undertaken by PCPs, others have highlighted the advantages of treatment by experts when compared to community care (Matheson et al. 2013;Weiss et al. 2006). In line with the latter, a recent review of the literature on ADHD and the organization of care for individuals with ADHD by the Swedish Council of Health Technology recommended that beside of assessment and diagnosis, treatment of

ADHD still should be provided by specialized services (Swedish Council on Health Technology Assessment 2013).

6.1.6 Psychosocial treatment of adult ADHD

This topic was not investigated extensively in our study. Based on the limited information available we found that a substantial number of participants (35-60%) had not been provided with any kind of nonpharmacological or psychosocial interventions. Thus, our results are well in line with recent findings (Matheson et al. 2013), and reflect the challenges for many adults with ADHD. Observed differences in reported frequencies of perceived nonpharmacological treatment between the two study samples were probably related to the fact that almost 24 % of participants in the *SIBBE* study had been diagnosed and treated for the disorder in childhood/adolescence. This group may, at least during the time of follow up in child and adolescent psychiatric services, have had access to other treatment options than pharmacological treatment alone (Matheson et al. 2013).

Our findings were not in line with national (Norwegian Board of Health Supervision 1998;The Norwegian Directorate of Health 2007), and international guidelines (National Institute for Health and Clinical Excellence 2008) that recommend drug treatment of ADHD in most cases only as part of a comprehensive and multidimensional treatment plan that includes strategies for psychological, behavioral, and educational needs. Indeed, the NICE[50] guidelines, which recently have been found to have superior methodological quality compared with other guidelines on ADHD (Seixas et al. 2012), recommend use of pharmacological treatment only as first choice in cases with severe impairment (National Institute for Health and Clinical Excellence 2008).

Compared to the scientific evidence provided by the large number of both randomized and open labeled psychopharmacological treatment studies in adults with ADHD, the strength of evidence for nonpharmacological and psychosocial interventions still is less convincing (Moriyama et al. 2013;Seixas et al. 2012;Sonuga-Barke et al. 2013). It has to be taken into account that what today is

[50] NICE National Institute for Health and Clinical Excellence

recommended as psychosocial treatments for adults with ADHD (e.g., different forms of CBT, either individual or group based), hardly were available during the time of our investigations. Recent reviews have shown that CBT[51] is an effective treatment for adults with ADHD (Mongia and Hechtman 2012). Whereas one study found the combination of ADHD drug treatment and CBT to be more effective than ADHD pharmacotherapy alone (Safren et al. 2005), a recent study did not find that ADHD medication significantly augmented the outcome of CBT therapy in adults with ADHD when compared to CBT and placebo (Weiss et al. 2012). Therefore, the question of the real benefits of combined treatment approaches versus either pharmacotherapy or psychotherapy alone is still unresolved and needs further investigation.

6.1.7 Variables associated with more favorable outcomes in adults with ADHD

In line with recommendations by others (Torgersen et al. 2008), we defined more favorable outcomes not only by the frequency and severity of ADHD symptoms, but also included measurements of current functioning. A more favorable outcome was characterized by a combination of an ASRS Screener score below the cutoff of 14, and a measurement score on current functioning in line with population norms.

We found that only a limited number of participants (21.5 % in the *SIBBE* study, and 19.1% in the *Fifty Plus* study) fulfilled the predefined criteria for more favorable outcomes. Among investigated characteristics unemployment and psychiatric comorbidity predicted poorer outcome. With respect to the latter our results were in line with findings that have identified psychiatric comorbidity to be an important factor for impairment and persistence of ADHD symptoms (Biederman 2005;Biederman et al. 2010;Biederman et al. 2011;Biederman et al. 2012;Hechtman 1999;Lara et al. 2009). Likewise has employment been reported to be one of several predictors of treatment response in adults with ADHD (Buitelaar et al. 2011a), and has in general been found to be important for quality of life (Aronson 1997).

Although employment rates in our study (e.g. 40 % in the *Fifty Plus* study) were somewhat higher than in other Norwegian studies on adults with ADHD (e.g., 22 %

[51] CBT cognitive behavior therapy

to 24 %), these still were below their population-derived controls (72 to 79 %) (Gjervan et al. 2012a;Halmoy et al. 2009;Kupper et al. 2012). The results in our study were far beyond the rates of employment (84 %) that recently have been presented in a 33-year follow-up study of childhood ADHD (Klein et al. 2012).

In adults with ADHD occupational underattainments (Biederman et al. 2008;Rasmussen and Gillberg 2000), lower work performances (De Graaf et al. 2008) and lower occupational functioning (Barkley et al. 2006) have been reported frequently. Severity of ADHD symptoms has been found to be associated with work impairment (Safren et al. 2010), and working disability with subsequently disability pension (Mordre et al. 2012). In his comprehensive review Barkley concluded that no other factor than ADHD per se predicted occupational outcome in adults with ADHD (Barkley et al. 2008). This statement has recently been further specified as a European study found that in particular symptoms of inattentiveness were a strong predictor for occupational outcome in adults with ADHD (Gjervan et al. 2012a;Gjervan et al. 2013).

We did not find that severity of baseline ADHD symptoms, and ADHD treatment before adulthood predicted outcome. These variables have been reported to be associated with more favorable outcome in some studies (Biederman et al. 2011; Kessler et al. 2005c;Lara et al. 2009;Molina et al. 2009), whereas others found that childhood ADHD symptom severity was not predictive for adult outcome (Dalsgaard et a. 2002). In a large European study on adults with ADHD stimulant treatment during childhood was the strongest predictor for being in work in adulthood (Halmoy et al. 2009).

6.1.8 ADHD in middle-aged and late adulthood

Our study on adults aged 50+ with ADHD covers an age range from 50-69 years with a mean age of 56 years, and do by this provide a glimmer of light into what might happen in middle-aged and late adulthood. On average, participants were about 50 years of age when diagnosed with ADHD. By this, our sample was only slightly younger than reported in some other studies (Brod et al. 2012;Henry and Jones 2011;Manor et al. 2011).

With an observation time of more than 5 years, our study was one of the first that has investigated use, persistence and outcome of psychopharmacological treatment for ADHD in this age group. Prior to this, only a few case reports (Biederman 1998;da Silva and Louza 2008;Wetzel and Burke 2008), and a pilot study on 11 adults aged 55 years and older with newly diagnosed ADHD and treated with MPH for at least two months (Manor et al. 2011) had been available. Whereas the latter reported similar response to MPH treatment as in younger adults, we found that those currently treated indeed reported better attention but not hyperactivity/impulsivity than participants who were not being treated with ADHD medications. When we looked into the ASRS Screener mean scores for our three treatment groups (e.g., currently treated, stopped treatment, and treatment naive) all were above the recommended diagnostic cutoff of 14 for this instrument, and did not differ significantly (for an in depth discussion of this topic see Chapter 6.1.2).

We did not investigate adverse events of psychopharmacological treatment for ADHD in particular, but mean dosages of stimulant medications were in line with evidence-based recommendations. In the Manor et al. study no significant adverse effects of MPH treatment were reported (Manor et al. 2011). A recent review of long-term efficacy and safety of treatment with stimulant medication in adult ADHD concluded that when cardiac conditions were ruled out at least a modest burden of adverse events of treatment with stimulant medication had to be expected (Fredriksen et al. 2013). It has recently been pointed out that results from two large registerbased studies on ADHD medications and risk of serious cardiovascular events (Cooper et al. 2011;Habel et al. 2011), may have been somewhat misleading as a substantial number of adults were treated without having a mental disorder diagnosis (Olfson et al. 2013). In older adults with ADHD significantly higher rates of heart disease and cerebrovascular accidents compared to controls have been reported (Semeijn et al. 2013a). Thus, increasing cardiovascular problems with age, potentially higher doses of therapeutic drugs needed and slower drug elimination are some of the concerns that have been raised when considering use of stimulant medication in older adults (Retz et al. 2011;Weiss et al. 2001;Westover and Halm 2012). Therefore this topic still needs further attention.

Whereas Brod et al. investigated the burden of ADHD in older adults (mean age of 66 years) compared to younger adults with ADHD (Brod et al. 2012), we were the first to study QoL[52] in middle-aged and older adults with ADHD compared with population norms. In both studies a majority of participants were currently taking ADHD medications. The sample of older adults in the Brod study, who on average had a higher annual income than the median US household, had a significantly better life outlook than their younger counterparts (Brod et al. 2012). Interestingly, an investigation in older women with ADHD also reported about some successful lives and careers despite having lived with an undiagnosed ADHD for the most of their lives (Henry and Jones 2011). In our study the educational level between the index and the reference sample did not differ statistically. More adults aged 50+ with ADHD were unemployed, and the ADHD sample reported significantly reduced QoL when compared with population norms.

Our sample reported small changes in the severity of the core symptoms of the disorder compared to ten years ago. In line with this, studies showed that the experiences of ADHD symptoms in older adults were not very different from what has been reported in younger adults with the disorder (Brod et al. 2012;Henry and Jones 2011;Manor et al. 2011;Wetzel and Burke 2008).

We found that ADHD symptom severity, particularly inattention, was significantly negatively correlated with daily living and health. Although only a minority of participants in the Brod et al. study suspected their ADHD symptoms to be a consequence of cognitive problems or dementia (Brod et al. 2012), some studies already have looked into possible associations between ADHD and mild cognitive impairment (Ivanchak et al. 2012), or different forms of dementia (Golimstok et al. 2011;Ivanchak et al. 2011) but with inconsistent results.

6.2 Methodological considerations

6.2.1 Study design

Naturalistic follow-up studies in adults with ADHD are warranted to gather more information on effectiveness and outcome of treatment over a longer period of time

[52] QoL quality of life

(Weiss et al. 2006). There are significant challenges to demonstrate long-term effect of psychopharmacotherapy due to problem of nonadherence to treatment, self-selection of treatment continuation, access to treatment, variability in treatment quality, and confounding effects of concurrent treatment, co-occurring disorders as well as environmental and psychosocial factors (Hazell 2011). According to Hazel it is important "*to distinguish long-term effects of treatment from effects of long-term treatment, as they are not synonymous*" (Hazell 2011).

Our investigations on treatment and outcome in adults with ADHD in different age groups are descriptive and cross-sectional. They provide a "*snapshot*" (Hennekens and Buring 1987) of experiences of our study groups at one point in time, and can be of importance for health authorities in the development of appropriate health care strategies for adults with ADHD. The cross-sectional design does not, however, permit causal conclusions, and our findings are limited to associations that must be interpreted with caution (Kirkwood and Sterne 2011;Thelle 1998). On the other hand, hypotheses for future studies can be formulated based on some of these findings.

Our study samples were relatively large, and lived geographically spread around the country. When financial and other resources are limited, the use of questionnaires can be of advantage when one wants to reach as many as possible (Friis and Vaglum 2002). For example, questionnaires can be answered more flexible than a time-demanding appointment in the clinic. They can be used in anonymous studies such as the *Fifty Plus* study (Friis and Vaglum 2002). A disadvantage is that we were unable to describe those who had decided not to participate in the study. In general, the group of non-participants in questionnaire surveys can be challenging as this might consist of individuals with either a better or a poorer outcome than reported by participants (Friis and Vaglum 2002).

Evidence-based strategies of prenotifaction (Edwards et al. 2007) were used to increase response rates in adults with ADHD in the *SIBBE* study, whereas representatives of collaborating partners recommended prenotifaction in the *Fifty Plus* study as unnecessary. Expert and focus groups were used in the development of the questionnaires. Whenever appropriate, standardized instruments and items were included (Friis and Vaglum 2002). We used reference groups to compare our

findings in adults' aged 50+ with ADHD with population norms. The questionnaire for physicians in the *SIBBE* study contained many identical questions from the patient questionnaire, and could by this either confirm or disprove information given by participating adults with ADHD.

6.2.2 The sample of the SIBBE study

The eligible sample of the *SIBBE* study was retrieved from a regional registry that at the same time was part of a national registry of adult ADHD. The latter has been included in several recently published studies on adults with ADHD with an emphasis on for example occupational and functional outcome (Halmoy et al. 2009), ADHD and bipolar symptoms (Halmoy et al. 2010), and the impact of cyclothymic temperament in adult ADHD (Landaas et al. 2012).

Similar to our investigations, a regional registry on adult ADHD from a different part of the country has been the starting point for several other publications on adults with ADHD, such as gender differences in untreated adults with ADHD (Rasmussen and Levander 2009), clinical characteristics and predictive factors in adults with ADHD (Torgersen et al. 2006;Torgersen et al. 2012;Torgersen et al. 2013), functional impairment and QoL in adults with ADHD (Gjervan et al. 2012a;Gjervan et al. 2012b;Gjervan et al. 2013), and the burden of untreated ADHD (Goksoyr and Nottestad 2008).

As a majority of research on adult ADHD has been performed in North America, studies from other parts of the World, such as Europe are warranted to support, correct, fill in, and supply our understanding of the disorder. For instance, a recent study showed that European adults with ADHD reported similar baseline characteristics when compared with studies from outside of Europe (Upadhyaya et al. 2013).

From the eligible sample in the *SIBBE* study 35 % agreed to participate, which may have led to a selection bias. There was no difference on main sample characteristics between participants and non-participants (see Chapter 3.3.1 for more information).

Beside that, the response rate in our study was in line with other studies on adult ADHD (Gjervan et al. 2012a;Halmoy et al. 2010).

Clinical characteristics in our study, such as age, educational level, rate of employment, ADHD subtypes and symptomatology, and psychiatric comorbidity of participants, were similiar to what has been reported by others (Gjervan et al. 2012a;Halmoy et al. 2009;Rasmussen and Levander 2009;Torgersen et al. 2006;Torgersen et al. 2012). Significantly more men than women had been diagnosed with ADHD during childhood and adolescence as in previous reports (Halmoy et al. 2009;Torgersen et al. 2012), and mirrors that ADHD in girls until recently had attracted little attention (Gaub and Carlson 1997). Overall, it has been shown that European adults with ADHD reported somewhat lower numbers of prior exposure to stimulant treatment compared with figures from outside of Europe (Upadhyaya et al. 2013).

The *SIBBE* study sample comprised unlike other studies a quite balanced gender distribution, which may have influenced the findings. As documented by others, studies of gender differences as to severity of symptoms and clinical presentations are limited in adults with ADHD (Biederman et al. 2004;Rasmussen and Levander 2009). Although we found the study sample to be fairly representative, we have to acknowledge that those with less benefits of treatment may have chosen not to participate, which may have biased our findings (Surman et al. 2013).

6.2.3 Primary care physicians (PCPs)

According to national guidelines, PCPs can become responsible for psychopharmacological treatment of adults with ADHD after a specialist has diagnosed the disorder, initiated psychopharmacological treatment and considered the condition as stable (The Norwegian Directorate of Health 2007). In line with this, recent investigations showed that psychopharmacological treatment of ADHD by PCPs has increased substantially (Asheim et al. 2007;Lillemoen et al. 2012). In 2008 nearly 80 % of a national sample of PCPs was found to prescribe stimulant medication due to the diagnosis of ADHD (Lillemoen et al. 2012). International guidelines on ADHD (National Institute for Health and Clinical Excellence 2008),

and a recent Scandinavian chart review study (Pottegard et al. 2012) highlighted that general practitioners are an essential part of long-term treatment in patients with ADHD.

Among included participants in the *SIBBE* study (n=368), a majority of 274 adults with ADHD (74.5 %) reported treatment for their disorder by a PCP (Paper II). In our study on use and misuse of stimulant medication as reported by patients and their PCPs, more than 40 % of the eligible sample could not be included in the analysis because of a lack of response by the PCPs responsible for their ADHD treatment. We were unable to control for potential differences between PCPs who had participated and those who did not. Among participating PCPs most reported on one adult with ADHD (93.7 %), whereas nine reported on two patients, and one reported on three. Female PCPs treated 31 % of the participants.

In the questionnaire for PCPs we did not address the patients' adherence, time on treatment, number of treatment cessations, or who that had made the decision to stop pharmacotherapy for ADHD in particular. Neither did we investigate the duration of the physician-patient relationship, and the frequency of appointments for treatment of ADHD. This may have limited our conclusions.

6.2.4 The sample of the Fifty Plus study

Participants in this study were recruited from the national patient organization, which is not necessarily a representative sample of all adults with ADHD. As membership of a patient organization may require personal engagement and continuity, more severely impaired adults with ADHD may have been underrepresented, which could limit the generalizability of our findings in the *Fifty Plus* study. About one-third of the eligible participants did not participate, and it is possible that this group may have comprised adults with more severe ADHD.

Although baseline information was limited, research showed that the levels of functional and psychosocial impairments in undiagnosed adults with ADHD are quite similar to those in adults who have been diagnosed with ADHD (Able et al. 2007;Biederman et al. 2006a;Shekim et al. 1990). Our study sample consisted of

more women than men. Findings by others have indicated that gender differences in the severity of symptoms and clinical presentations are limited in adults with ADHD (Biederman et al. 2004;Rasmussen and Levander 2009).

The frequency of self-reported medical problems in the *Fifty Plus* sample was higher than reported in samples of younger adults with ADHD (Barkley et al. 2008). Conversely, and in line with our findings, higher numbers of medical disorders than expected were found in a study of older adults diagnosed with ADHD (Manor et al. 2011). The possibility of an increased risk of physical health problems in ADHD, for example due to impulsive behavior, poor decision making or executive function deficits have been highlighted recently (Nigg 2012).

6.2.5 Reported measurements

The diagnostic assessment process of adult ADHD as a clinical diagnosis was in line with national recommendations and guidelines (Norwegian Board of Health Supervision 1998;The Norwegian Directorate of Health 2007), clinical recommendations (McCann and Roy-Byrne 2004;McGough and Barkley 2004;Murphy and Adler 2004;Weiss and Murray 2003), and a recently published European consensus statement on adult ADHD (Kooij et al. 2010). The diagnosis of ADHD in adults was made according the diagnostic criteria in ICD-10 and DSM-IV, respectively. Although recommended by some, no adjustments with respect to time of onset or number of criteria needed for the diagnosis of adult ADHD were made (Barkley et al. 2008;Kooij et al. 2005;Kooij et al. 2010). Interestingly, a recent investigation found that age and gender had minimal effect on ADHD symptoms (Gomez 2013). Findings from the latter study also suggested that a hyperkinetic disorder model, with the three core symptoms as separate factors might fit the assessment of adults better than the DSM-IV approach with inattention and hyperactivity/impulsivity as two separate factors (Gomez 2013).

Results from our study are mainly based on self-reports, and the reliability can be questioned. Several studies have documented that adults with ADHD are reliable reporters of their current symptoms (Dias et al. 2008;Kooij et al. 2008;Magnusson et al. 2006;Murphy and Schachar 2000), and even are at risk to underestimate their own

ADHD related impairment (Adler et al. 2008;Barkley et al. 2002;Manor et al. 2012;Sibley et al. 2012).

The *ASRS v1.1 Screener* (Kessler et al. 2005a) is a widely used instrument to assess ADHD symptoms in adults, and has been translated into several languages and validated for different clinical populations (Daigre et al. 2009;Kim et al. 2013;Morin et al. 2013;Obel et al. 2009;Rodriguez et al. 2007;van de Glind et al. 2013). The instrument has been found to have good test-retest reliability (Matza et al. 2011), and an adequate sensitivity and specificity in specialized services and primary care (Dakwar et al. 2012;Hines et al. 2012). A two-factor solution with inattentiveness and hyperactivity/impulsivity as separate factors have been proposed (Hesse 2013), and has been applied in a large population based study in middle-aged adults recently (Das et al. 2012). Although the ASRS Screener has a strong concordance with clinical diagnoses, the instrument has some weaknesses with respect to other medical conditions and comorbidities, and does not assess for inconsistencies or malingering (Hines et al. 2012). Compared with other adult ADHD rating scales, the ASRS Screener has been found to be the simplest and shortest instrument to administer, and has been widely accepted in clinical practice and research (Dakwar et al. 2012;Rosler et al. 2010b).

The *SCL-90-R* (Degoratis 1994) has been used in several studies in adult ADHD to assess co-existing psychopathology (Gjervan et al. 2012a;Hesslinger et al. 2002;Murphy et al. 2002;Rosler et al. 2010a;Shekim et al. 1990). These studies reported elevated rates of psychological distress on all subscales of the SCL-90-R when compared to controls and population norms. Findings from the Norwegian expert teams correspond well with the latter (Aanonsen et al. 2005). Nine selected items of the SCL-90-R with an acceptable sensitivity (75%) but only moderate specificity (54%) have been proposed as a new useful rating scale for ADHD recently (Eich et al. 2012). The SCL-90-R has also been applied to investigate the psychopathology in parents of children with ADHD. Among these parents with lifelong persistent ADHD higher scores of psychopathology measured with the SCL-90-R than controls and parents with remitted ADHD was reported (Steinhausen et al. 2013). These findings correspond well with initial reports on parents of hyperactive

children some decades ago, where increased rates of psychiatric comorbidity were found (Cantwell 1972;Morrison and Stewart 1971;Morrison and Stewart 1973).

The *MHI-5* (Ware, Jr. et al. 2000) has to the best of our knowledge not been applied solely in studies on adult ADHD. The instrument is a subscale of the Short From (SF-36), which has been used in several investigations on adult ADHD (Adler et al. 2006;Gjervan et al. 2012b;Matza et al. 2007). In some of these studies baseline MHI-5 levels below population norms have been reported. Improvement after psychopharmacological treatment for the disorder has been described (Adler et al. 2006). Others have found symptoms of hyperactivity/impulsivity to predict mental health outcomes (Gjervan et al. 2012b). The MHI-5 correlates highly with several short forms of the SCL, and one operational advantage of this instrument over the SCL is that is has been used in surveys on mental and on general health (Strand et al. 2003).

The *SDS* (Leon et al. 1997) has been frequently used as a secondary QoL outcome measure in psychopharmacological studies in groups of younger adults with ADHD (Adler et al. 2006;Buitelaar et al. 2011b;Fallu et al. 2006;Michelson et al. 2003;Rosler et al. 2013;Spencer et al. 2006;Weiss et al. 2012). In some of these studies significantly improved SDS scores after a longer period of treatment were reported (Adler et al. 2006;Buitelaar et al. 2011b), whereas others discussed whether a short-term improvement on SDS scores could decrease over time (Rosler et al. 2013). Besides this, the latter study found that improvement on SDS scores was fully mediated by improvements on an investigator rated ADHD scale (Rosler et al. 2013). Thereagainst others reported that changes in SDS scores were predicted by patients' characteristics such as age, sex, and comorbid depression (Spencer et al. 2006).

The *EQ-5D* (The EuroQol Group 1990) has not been used extensively as a measurement of QoL in the field of ADHD. This brief QoL instrument was used to assess HRQoL in children with ADHD (Matza et al. 2005b), and has recently been listed as one of the instruments in a comparison study on European and non-European adult ADHD (Upadhyaya et al. 2013). Although it has been argued that the use of a generic measure of HRQoL may not capture serious impairments unique for the disorder (Brod et al. 2005;Weiss et al. 2010), our aim in the *Fifty Plus* study was

to enable a comparison with population norms to investigate the impact of ADHD in middle-aged and late adulthood.

The *SWLS* (Diener et al. 1985) has not been used frequently in ADHD research so far. We are aware of only one study where this instrument was used to assess satisfaction with life among university students (Gudjonsson et al. 2009). Here, an association between ADHD symptoms, comorbid difficulties, and reduced SWLS scores was found (Gudjonsson et al. 2009).

6.2.6 Strengths of the study

Our results are strengthened by the relatively large and fairly representative samples of adults with ADHD in different age groups. The naturalistic design and length of observation time in the *SIBBE* study reflects common clinical challenges with respect to follow up of adults with ADHD. Information from multiple sources (e.g., self-reports, physician reports, rating scales) has contributed to investigate use, persistence and outcome of mainly psychopharmacological treatment in adults with ADHD. Validated instruments were used to enable comparison with population norms. In the *Fifty Plus* study information was collected anonymously, which may have contributed to honest answers from participants. The study consists of both clinical and non-clinical samples of adults with ADHD.

7. CONCLUSIONS

This study has investigated treatment and outcome in adults with ADHD in different age groups. Taking methodological considerations and study limitations into consideration, the following conclusions arise:

- Among participants in different age groups a majority reported current psychopharmacological treatment for ADHD mainly with stimulant medication, 4-5 years after initiation.

- Those currently being treated psychopharmacologically for ADHD reported significantly less ADHD core symptoms than those currently not medicated for the disorder. However, current mental and psychosocial functioning was not significantly different between treatment groups, and considerably impaired relative to controls and clinical cutoff criteria.

- Psychopharmacological treatment for ADHD for more than two years was associated with better functioning than treatment for two years or less.

- Primary care physicians and their ADHD patients agreed on the pharmacological, but not the nonpharmacological treatments given. Physicians and patients reported low levels of misuse of stimulant medication. The results suggest that primary care physicians can safely undertake psychopharmacological treatment of ADHD when the condition is stable.

- Use of psychosocial treatment programs for ADHD, as part of a comprehensive treatment plan and in addition to psychopharmacological treatment for the disorder, was limited.

- Quality of life in adults with ADHD was significantly reduced compared with population norms.

- Comorbidity, unemployment, and ADHD symptom severity were associated with less favorable outcomes.

- The negative impact of ADHD persisted into middle aged and late adulthood.

8. IMPLICATIONS

8.1 Clinical implications

The result with respect to maintainment or long-term persistence of pharmacotherapy is an important clinical finding as it challenges the common understanding that this group of patients often terminate treatment at an early stage.

Our findings suggest that long-term treatment with stimulant medications is experienced as beneficial for adults with ADHD. Therefore efforts should be made so that adults with ADHD are given the option of long-term pharmacological treatment for the disorder. It is our opinion that several actions can be taken to improve maintainment of pharmacotherapy and possibly the long-term outcome of the disorder.

For example, a lesson can be learned from a study where only those adults with ADHD who had experienced a robust investigator rated symptom reduction of at least 50 % after initial pharmacotherapy, were included in a longer lasting open label trial of treatment with MPH[53]. These adults reported high rates of symptom reduction and clinical improvement over time (Wender et al. 2011). Compared to nowadays-clinical practice this would mean that pharmacological treatment of each adult with ADHD should follow a predefined set of criteria and time span for evaluation with respect to e.g., treatment continuation or switching to a different compound when the expected symptom reduction not has been achieved. In line with the aforementioned, a recent review on head to head comparison studies of long-acting MPH formulations concluded: "*Different patients have both different treatment needs and responses to MPH. There is now clear evidence that, in order to optimize the treatment of ADHD symptoms, a tailored approach to treatment is required. This involves both an initial titration onto medication and a continued follow up, with careful adjustments in dose and often in MPH formulation. It is important to track symptoms and response across the day*" (Coghill et al. 2013).

A minority of participants in our study had stopped treatment with medication for ADHD, either due to side effects, lack of efficacy, or other reasons. Already years

[53] MPH methylphenidate

ago Weiss and Hechtman wrote: "*While stimulants were viewed as more beneficial than other medications, taking any "pills" was strongly disliked by the majority of hyperactive adults. ... Reasons for disliking medication seemed relatively unrelated to its efficacy, but were sometimes related to its side effects. Subjects felt that the physicians who prescribed their medication had not adequately discussed why this was indicated and what the possible side effects might be."* (Weiss and Hechtman 1993). It is our opinion that a more mutual understanding of commitment and adherence to treatment can contribute substantially to better outcome in adults with ADHD (see for example the concept of "*dynamic adherence*" suggested by Gearing et al. 2011). Research on pharmacological treatment of ADHD has shown that "*patients want to feel supported in their decision to stop, to understand possible outcomes, and to be able to reaccess medication if it is needed*" (Wong et al. 2009). In a mutual relationship, this would assume an "*ethical responsibility*" from both parts, e.g., the physician and the patient (Rothenberger and Rothenberger 2013).

Our study provides some evidence that treatment of adults with ADHD in many cases should be continued for more than two years. This has important clinical implications for physicians and patients when to discuss expected length of and commitment to treatment after a diagnosis of ADHD has been established. Psychopharmacological treatment was associated with reduced ADHD symptom severity when compared to those who were not currently medicated for the disorder. For the majority of participants ADHD symptom severity and current functioning still was above remission as a goal of treatment. It is our opinion that it is necessary to tailor individual treatment schedules (Coghill et al. 2013;Powell et al. 2011), where treatment is offered in a systematic way with regular visits and a continuous approach to optimize adherence and outcome by providing available treatment strategies (Lundh et al. 2013;van de Loo-Neus GH et al. 2011). As the majority of participants in our study were treated with stimulant medications, one should be cautious to generalize the findings to treatment with nonstimulant medications.

We found that pharmacological treatment of adult ADHD safely can be transferred to PCPs[54] when the condition is stable. This is of clinical importance as PCPs are an essential part of the treatment system. The public opinion of pharmacotherapy of

[54] PCP primary care physician

adult ADHD is often challenged by a suspected risk of misuse and diversion of stimulant medication. Therefore, the low rates of reported misuse of stimulant medication, and the high level of PCP-patient agreement on this topic are of clinical relevance for adults with ADHD, their physicians, and National Health Authorities.

In our study adults with ADHD rarely were provided psychosocial treatment programs either as part of a comprehensive treatment plan or alone. This is of clinical importance as guidelines on ADHD highlights the need for multidimensional and comprehensive interventions. Taken the results of a limited reduction in ADHD symptomatology and impaired current functioning in a majority of cases in our study into consideration, the need for increased availability of such interventions is obvious. Simultaneously it is important to choose evidence-based treatment approaches rather than programs with less scientific evidence. Studies have shown that structured CBT[55] programs are superior to supportive therapy, discussion groups, and patient education (Knouse and Safren 2010;Philipsen 2012). The lack of long-term benefits of patient education also has been reported from other disciplines in medicine (Duke et al. 2009;Riemsma et al. 2003). We strongly recommend that educational programs for professionals should rely on these findings.

There is a need for an improved physician-patient relationship. Several studies have shown that structured educational programs can improve the quality of services provided by PCPs for patients with ADHD (Carroll et al. 2013;Epstein et al. 2008;Fallu and Klassen 2013;Wolraich et al. 2010). Efforts should be made to extend these programs to cover all aspects of adult ADHD.

We were able to show that a majority of middle-aged and older adults with ADHD reported to be currently on pharmacological treatment for the disorder. As still little is known about pharmacological treatment of ADHD in these age groups, physicians have to be particularly aware of an increased risk of side effects, and the possibility of a different pharmacotherapeutical profile. It is our opinion that it is important to update guidelines on ADHD with respect to these age groups. This seems even more necessary as for example memory clinics in an increasing manner will have to deal with assessment of ADHD (Fischer et al. 2012;Pose et al. 2013), and probably will

[55] CBT cognitive behavior therapy

be challenged by the lack of a good screening instrument for ADHD in late adulthood (Semeijn et al. 2013b).

Middle-aged and older adults with ADHD reported significantly reduced QoL[56] when compared to controls. We observed increased rates of unemployment in our index group compared to normal controls. In addition, relational problems, and the burden of ADHD as a disorder that "*runs in families*" have to be taken into consideration. Many of our participants had children, and even grandchildren who also had been diagnosed with ADHD. Therefore, psychosocial intervention programs addressing the multiple challenges of e.g., living with the disorder and taking care of the family have to be developed and addressed in particular. An increased collaboration with patient organizations can be valuable.

Prolonged treatment by specialists should be considered when ADHD symptom scores are high and dysfunctions significant despite adequate treatment options. This will require comprehensive services that may be difficult to establish in all areas. Therefore some have argued for specialized lifetime ADHD clinics, a topic that has to be discussed further.

8.2 Considerations for future research

The results presented in this thesis are mainly based on self-reports of selected samples of adults with ADHD in different age groups.

We presented in **Paper I** and **Paper III** that those currently treated psychopharmacologically reported less severe ADHD symptomatology than those not medicated, but the majority of patients was not in remission. Independent of treatment status a large majority of participants reported impaired current functioning. Use, persistence and outcome of long-term psychopharmacological treatment of adults with ADHD in clinical settings should be investigated further in prospective, longitudinal follow-up studies. The advantage of multiple sources of information (e.g., patient report, clinician report, objective measures, register data,

[56] QoL quality of life

regular evaluation), and a structured assessment of nonpharmacological interventions should be utilized.

In **Paper I** we presented some evidence that treatment of adults with ADHD for more than two years was associated with better functioning than treatment for two years or less. Our assumptions were based on previous research of long-term treatment. The appropriateness of such a premise should be investigated further.

Primary care physicians (PCPs) have become an essential part in treatment of adults with ADHD. Although we as presented in **Paper II** found that PCPs and their ADHD patients agreed on pharmacological treatments given, we did not investigate several important aspects, for example treatment satisfaction, persistence of treatment as reported by PCPs, and whether provided psychopharmacological treatment was in line with recommendations in particular. The usefulness of outlined strategies for improved treatment adherence in adults with ADHD such as shared decision making, and the concept of dynamic adherence should be investigated in future research studies.

The frequency of multidimensional treatment approaches including nonpharmacological/psychosocial interventions in our studies was low as reported in **Paper I**, **Paper II**, and **Paper III**. There is, on the other hand, an increasing awareness and scientific evidence for the effectiveness of either individualized or group oriented psychotherapeutical interventions in adults with ADHD. As this kind of structured treatment programs so far rarely are available in clinical practice, other types of psychosocial interventions such as patient education are provided, and they lack sufficient scientific evidence. Future research should investigate the effectiveness of patient education versus structured treatment programs. Recommendations for best possible treatment approaches for adults with ADHD could be supported by results from nonpharmacological head to head studies.

Our findings of significantly impaired quality of life in middle-aged and older adults with ADHD compared to controls, and high rates of use and persistence of psychopharmacological treatment as presented in **Paper IV** and **Paper III** respectively, are preliminary, and should therefore be investigated further in prospective studies of clinical samples.

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I

PAPER I

Michael B. Lensing, MA; Pål Zeiner, MD, PhD; Leiv Sandvik, PhD; and Stein Opjordsmoen, MD, PhD. **Four-Year Outcome in Psychopharmacologically Treated Adults with Attention-Deficit/Hyperactivity Disorder: A Questionnaire Survey.** *J Clin Psychiatry 2013*; 74(1):e87-e93 DOI: 10.4088/JCP.12m07714

PAPER II

Michael B. Lensing, Pål Zeiner, Leiv Sandvik & Stein Opjordsmoen. **Adults with ADHD: use and misuse of stimulant medication as reported by patients and their primary care physicians** [Epub ahead of print 2013 Aug 22]. *ADHD Attent Def Hyp Disord*; DOI 10.1007/s12402-013-0116-8

II

PAPER III

Michael B. Lensing, Pål Zeiner, Leiv Sandvik & Stein Opjordsmoen. **Psychopharmacological Treatment of Attention-Deficit/Hyperactivity Disorder (ADHD) in Adults Aged 50+: An Empirical Study**. [*submitted*]

III

PAPER IV

Michael B. Lensing, Pål Zeiner, Leiv Sandvik & Stein Opjordsmoen. **Quality of Life in Adults Aged 50+ With ADHD** [Epub ahead of print 2013 March 20]. *Journal of Attention Disorders*; XX(X) 1-9 DOI: 10.1177/1087 05471 134 0035

IV

APPENDIX I

Etterundersøkelse blant voksne med ADHD Studie om iverksatt behandling, behandlingsforløp og effektvurdering (SIBBE) - spørreskjema for pasient

ID-nummer:

9. Om du samtykker vil vi gjerne sende et spørreskjema til din lege.
Vennligst oppgi legens navn og adresse her:

Navn: _____

Legekontor:_____

Gate:_____

Postnummer og -sted: _____

10. Hvis det er noe mer du gjerne vil fortelle, setter vi stor pris på om du noterer det her eller skriver det ned på et eget ark.

SAMTYKKE - PROSJEKTDELTAKER

for studien *"Etterundersøkelse blant voksne med ADHD – Studie om iverksatt behandling, behandlingsforløpog effektvurdering"* (SIBBE)

Deltakelse i studien er basert på ditt frivillige, informerte samtykke. Dersom du ønsker mer informasjon kan du ta kontakt med oss. Dersom du sier ja til å delta i studien, må du signere under.

Jeg, _____ (navn med blokkbokstaver), bekrefter at jeg har mottatt skriftlig informasjon om studien, har fått anledning til å innhente den informasjon jeg har hatt behov for, og er villig til å delta i prosjektet.

Dato:_____ Signatur: _____

Send utfylt spørreskjema tilbake til oss i vedlagte ferdig frankerte svarkonvolutt.

Tusen takk for hjelpen.

ADHD livet

ID-nummer:

ULLEVÅL universitetssykehus

ADHD livet

Spørreskjema for pasient:

Etterundersøkelse blant voksne med ADHD

Studie om iverksatt behandling, behandlingsforløp og effektvurdering (SIBBE)

Ullevål universitetssykehus HF
v/prosjektleder Michael B. Lensing
Bygg 29, 0407 Oslo
Tlf.: 22 11 75 78 • Mobil: 41 46 99 86
mien@uus.no • www.ulleval.no/adhd-livet

ADHD livet

Oslo, januar 2009

Før jul fikk du tilsendt et spørreskjema om voksne med ADHD som i perioden 1997-2005 fikk tilrådet behandling med sentralstimulerende legemidler av Sakkyndig Team for hyperkinetisk forstyrrelse/ADHD i helseregionene Sør & Øst. Du hadde kanskje ikke tid til å svare på det da og jeg tillater meg derfor å sende spørreskjemaet en gang til.

Hvordan svare på spørreskjemaet?

Du kan enten besvare selve spørreskjemaet og sende det tilbake til oss, eller du kan benytte deg av en elektronisk besvarelse via Internett. Foretrekker du dette, må du bruke følgende fremgangmåte:

1. Gå til vår hjemmeside www.ullevål.no/adhd-livet
2. Velg pasientskjema. Du vil da bli viderekoblet til en ekstern, sikker side
3. Logg deg inn med ditt ID-nummer (du finner det øverst til høyre på neste side)
4. Svar på spørsmålene
5. Det elektroniske spørreskjemaet har ikke fritekst. Hvis du ønsker å kommentere noe må du derfor skrive dette ned og sende til oss. Du må gjerne benytte vedlagte svarkonvolutt til dette

Hvis du synes det er vanskelig å svare på spørsmålene, kan du be noen du har tillit til om hjelp. Du kan også gjerne ta kontakt med meg på telefon 221 175 78 (arbeid), 414 699 86 (mobil) eller sende meg en E-post på mien@uus.no.

Det er lagt ved et Flax-lodd som takk for din velvilje.

Oppdatert informasjon om studien finner du på vår hjemmeside www.ulleval.no/adhd-livet

Michael B. Lensing
Prosjektleder

ID-nummer:

A. Behandling

1. Har du fått medikamentell behandling mot ADHD? **Ja** ☐ **Nei** ☐
(Hvis nei, gå til spørsmål 9)

2. Bruker du fortsatt et medikament mot ADHD? **Ja** ☐ **Nei** ☐
(Hvis nei, gå til spørsmål 6)

3. Hvilket medikament mot ADHD bruker du *nå*? (Sett bare ett kryss)
Ritalin ☐ Ritalin kapsler ☐ Concerta ☐ Dexedrine ☐ Strattera ☐
Annet ☐ hva: _____

4. Hvor mange kapsler/tabletter bruker du pr. dag? .....

5. Hvor ofte har du i løpet av den siste uken *utelatt (glemt)* å ta din ADHD medisin?
(Bare ett kryss, fortsett deretter til spørsmål 9)
Aldri ☐
1-2 ganger ☐
3-5 ganger ☐
6-10 ganger ☐
mer enn 10 ganger ☐

6. Omtrent hvor lenge brukte du medikamentell behandling mot ADHD? ..... (angi tidsperiode)

7. Hvorfor ble den medikamentelle behandlingen avsluttet? (Kryss av for det som passer)
Bivirkninger ☐ Manglende/lite tilfredsstillende effekt ☐ Misbruk ☐ Bedring ☐
Graviditet ☐ Manglende oppmøte ☐ Vet ikke ☐
Annet ☐ hva: _____

8. Hvilket medikament mot ADHD var det siste du brukte? (Bare ett kryss)
Ritalin ☐ Ritalin kapsler ☐ Concerta ☐ Dexedrine ☐ Strattera ☐
Annet ☐ hva: _____

9. Har du fått annen behandling mot ADHD? (Kryss av for det som passer)
Psykoterapi/Samtalebehandling/Livsstilveiledning ☐
Gruppeterapi ☐
Kosthold/Ernæring ☐
Vold-/Sinnemestring ☐
Annet, hva ☐
Ikke aktuelt ☐

ID-nummer:

10. Er det i tillegg iverksatt andre tiltak? (Kryss av for det som passer)

- Ansvarsgruppe ☐
- Individuell plan ☐
- Sykepenger/sykelønn/rehabiliteringspenger ☐
- Yrkesrettet attføring ☐
- Uførepensjon, tidsbegrenset uførepensjon ☐
- Arbeidsledighetstrygd ☐
- Andre ytelser, hva ☐
- Ikke aktuelt ☐

11. Har du noen gang brukt høyere doser ADHD medisin enn foreskrevet av legen? Ja ☐ Nei ☐

12. Har du noen gang brukt ADHD medisin sammen med narkotia? Ja ☐ Nei ☐

13. Har du noen gang solgt din ADHD medisin? Ja ☐ Nei ☐

14. Har du opplevd bedring i forbindelse med behandling mot din ADHD?
(Sett ring rundt aktuelt tall)

Ingen	Lite			Moderat			Mye			Veldig mye
0	1	2	3	4	5	6	7	8	9	10

15. Hvordan vil du samlet sett vurdere kvaliteten på behandlingen du har fått?
(Sett ring rundt aktuelt tall)

Veldig dårlig	Dårlig			Middels			God			Veldig god
0	1	2	3	4	5	6	7	8	9	10

16. Hvis det er noe du ønsker å fortelle om behandlingen/tiltakene mot ADHD, setter vi stor pris på om du noterer det her eller skriver det ned på et eget ark.

ID-nummer:

B. Hvordan har du det?

De neste spørsmålene handler om hvordan du føler deg og hvordan du har det. Kryss av for det svaltermativet som best beskriver dette.

1. **Har du noen gang i voksen alder hatt en periode hvor du følte deg full av energi, hadde økt tiltaktslyst, lite søvnbehov, tankene raste av gårde, at du snakket uvanlig mye eller satte i gang mange prosjekter?** Ja ☐ Nei ☐

2. **Har du hatt noen periode i livet der du har vært vedvarende irritert slik at du skrek til folk, startet krangler eller begynte å slåss med noen utenom familien?** Ja ☐ Nei ☐

3. Hvor ofte har du i løpet av den siste uken	Hele tiden	Nesten hele tiden	Mye av tiden	En del av tiden	Litt av tiden	Ikke i det hele tatt
a. Følt deg veldig nervøs?						
b. Vært så langt nede at ingenting har kunnet muntre deg opp?						
c. Følt deg rolig og harmonisk?						
d. Følt deg nedfor og trist?						
e. Følt deg glad?						

4. Kryss av for det alternativet som best beskriver hvordan du har følt og oppført deg den siste uken.	Aldri	Sjelden	Av og til	Ofte	Svært ofte
a. Hvor ofte har du problemer med å avslutte en oppgave etter at de interessante delene er unnagjort?					
b. Hvor ofte er det vanskelig for deg å få orden på ting når du skal utføre en oppgave som krever organisering?					
c. Hvor ofte har du problemer med å huske avtaler eller forpliktelser?					
d. Når du har en oppgave som krever at du tenker nøye igjennom det du skal gjøre, hvor ofte unngår eller utsetter du å begynne på den?					
e. Hvor ofte sitter du og fikler med noe når du må sitte lenge i ro?					
f. Hvor ofte føler du deg overdrevet aktiv og tvunget til å gjøre noe, som om du var drevet av en indre motor?					

ID-nummer:

5. I hvilken grad har følelsesmessige problemer forstyrret ditt arbeid den siste uken?
(Sett ett kryss)

Ikke i det hele tatt	Lite			Moderat			Markert			Veldig mye	Ikke aktuelt
0	1	2	3	4	5	6	7	8	9	10	☐

6. I hvilken grad har følelsesmessige problemer forstyrret ditt sosiale liv den siste uken?
(Sett ett kryss)

Ikke i det hele tatt	Lite			Moderat			Markert			Veldig mye	Ikke aktuelt
0	1	2	3	4	5	6	7	8	9	10	☐

7. I hvilken grad har følelsesmessige problemer forstyrret ditt familieliv/ditt ansvar for hjemmet den siste uken? (Sett ett kryss)

Ikke i det hele tatt	Lite			Moderat			Markert			Veldig mye	Ikke aktuelt
0	1	2	3	4	5	6	7	8	9	10	☐

8. I det store og hele, vil du si at helsen din er: (Sett ett kryss)

Dårlig	Mindre god			God			Meget god			Utmerket
0	1	2	3	4	5	6	7	8	9	10

9. Alt i alt, hvor fornøyd er du med livet ditt?: (Sett ett kryss)

Svært misfornøyd ☐	Temmelig misfornøyd ☐	På det jevne ☐	Temmelig fornøyd ☐	Svært fornøyd ☐

ID-nummer:

C. Litt om deg

1. Hvilken sivilstand har du?

Gift ☐ Skilt/separert ☐ Samboer ☐ Enkemann/-kvinne ☐ Enslig ☐ Annet ☐

2. Er du i inntektsgivende arbeid? Ja, full tid ☐ Ja, deltid ☐ Nei ☐

3. Hvilken utdannelse har du fullført?

Ingen ☐
9-årig grunnskole ☐
1-2 årig videregående ☐
Videregående yrkesfaglig ☐
3-årig videregående, allmennfaglig, gymnas ☐
Høyskole ☐
Universitet ☐
Annet ☐

4 Får du eller har du fått behandling for noen av de følgende sykdommer eller helseproblem?
(Kryss av for det som passer)

Allergi ☐
Angst ☐
Astma ☐
Depresjon ☐
Epilepsi ☐
Hjerte/kar sykdom ☐
Migrene ☐
Spiseforstyrrelse ☐
Stoffskiftesykdom ☐
Søvnvansker ☐
Tourettes syndrom/Tics ☐
Andre langvarige sykdommer eller helseproblemer ☐
Hvis "andre langvarige..." beskriv hva: _____
Ikke aktuelt ☐

5. Tror du at du har en alvorlig uoppdaget sykdom? **Ja** ☐ **Nei** ☐

6. Har du fått behandling for rusmiddelmisbruk? **Ja** ☐ **Nei** ☐

7. Er skjemaet besvart av deg? **Ja** ☐ **Nei** ☐ (Hvis nei, gå til spørsmål 8)

8. Om nei, er skjemaet besvart av:

Ektefelle/samboer ☐ Pårørende ☐ Tjenesteyter ☐ Annet ☐ beskriv: _____

APPENDIX II

Etterundersøkelse blant voksne med ADHD Studie om iverksatt behandling, behandlingsforløp og effektvurdering (SIBBE) - spørreskjema for lege

12 Har det vært mistanke om at pasienten noen gang har brukt høyere doser ADHD medikasjon enn forskrevet? Ja ☐ Nei ☐ Vet ikke ☐

13 Har det vært mistanke om at medikamentet mot ADHD har blitt brukt sammen med narkotika? Ja ☐ Nei ☐ Vet ikke ☐

14 Har det vært mistanke om at pasienten har solgt sin ADHD medisin? Ja ☐ Nei ☐ Vet ikke ☐

15 Er det gitt annen behandling mot ADHD? (Kryss av for det som passer)

- Psykoterapi/Samtalebehandling/Livsstilveiledning ☐
- Gruppeterapi ☐
- Kosthold/Ernæring ☐
- Vold-/Sinnemestring ☐
- Annet, beskriv ☐
- Ikke aktuelt ☐

16 Er det iverksatt andre tiltak? (Kryss av for det som passer)

- Ansvarsgruppe ☐
- Individuell plan ☐
- Sykepenger/sykelønn/rehabiliteringspenger ☐
- Yrkesrettet attføring ☐
- Uførepensjon, tidsbegrenset uførepensjon ☐
- Arbeidsledighetstrygd ☐
- Andre ytelser, beskriv ☐
- Ikke aktuelt ☐

17 Er det gitt behandling for rusmiddelmisbruk? Ja ☐ Nei ☐

18 Er det gitt samtidig annen medikamentell behandling? Ja ☐ (angir hva) Nei ☐

Navn på medikament

19 Ut fra din kliniske erfaring, hvordan vil du vurdere pasientens nåværende fungering? (Bare ett kryss)

Alvorlig nedsatt	Noe nedsatt	På det jevne	God	Svært god

20 Om det er noe du ønsker å kommentere vil vi sette stor pris på om du vil notere det her eller på et eget ark

Kryss av for ditt bokønske, så får du tilsendt boken pr. post i løpet av kort tid.

- ☐ Hoem S (2008) *ADHD - en håndbok for voksne med ADHD*. 2. utgave
- ☐ Ryffel-Rawak D (2007) *Kvinner med ADHD*
- ☐ Rønhovde, LI (2008) *Ti tanker i huet og ingen på papiret*
- ☐ Youmans M (2008) *Helt hyper?*
- ☐ Zeiner P (red) (2004) *Barn og unge med ADHD*

Legg skjemaet i den frankerte og forhåndsadresserte returkonvolutten og send det til oss.

Tusen takk for hjelpen.

ULLEVÅL
universitetssykehus

ADHD livet

Spørreskjema for lege

Etterundersøkelse blant voksne med ADHD

Studie om iverksatt behandling, behandlingsforløp og effektvurdering (SIBBE)

Ullevål universitetssykehus HF
v/prosjektleder Michael B. Lensing
Bygg 29, 0407 Oslo
Tlf.: 22 11 75 78 • Mobil: 41 46 99 86
mien@uus.no • www.ulleval.no/adhd-livet

ADHD livet

Oslo, februar 2009

Kjære

Ad:

Du fikk for en stund siden tilsendt et spørreskjema om ovennevnte pasient som har ADHD og som i perioden 1997-2005 fikk tilrådet behandling med sentralstimulerende legemidler av Sakkyndig Team for hyperkinetisk forstyrrelse/ADHD i helseregionene Sør & Øst. Pasienten har samtykket i at dette spørreskjema kan sendes deg for besvarelse. Idet vi så langt ikke kan se å ha mottatt et svar tillater jeg meg å sende skjemaet en gang til og håper at du vil kunne avse 10-15 minutter til å svare på dette.

Hvordan svare på spørreskjemaet?
Det vil ta ca 10-15 minutter å besvare spørreskjemaet. Besvarelsen kan enten gjøres skriftlig på skjemaet under eller elektronisk. Velges sistnevnte løsning må det benyttes følgende framgangsmåte:

1. *Gå til vår hjemmeside www.ullevål.no/adhd-livet*
2. *Velg legeskjema. Du vil da bli viderekoblet til en ekstern, sikker side*
3. *Logg deg på med ditt Id-nummer som er:*
4. *Svar på spørsmålene og kryss av for ønsket boktittel*
5. *Det elektroniske spørreskjemaet har ikke fritekst. Hvis du ønsker å kommentere noe må du derfor skrive dette ned og sende til oss. Du må gjerne benytte vedlagte svarkonvolutt til dette.*

Om du skulle ha spørsmål kan undertegnede gjerne kontaktes på telefon 221 175 78 (arbeid), 414 699 86 (mobil) eller E-post: mien@uus.no

Som takk for innsatsen kan du velge mellom en av flere nye bøker om ADHD.
På siste side krysser du av for ditt bokønske, og du vil i løpet av kort tid motta ønsket bok pr. post. Mer og oppdatert informasjon om studien er tilgjengelig på www.ulleval.no/adhd-livet

Med vennlig hilsen

Michael B. Lensing
prosjektleder

1 Har pasienten fått medikamentell behandling mot ADHD? **Ja** ☐ **Nei** ☐
(Hvis nei, gå til spørsmål 15)

2 Bruker pasienten fortsatt et medikament mot ADHD? **Ja** ☐ **Nei** ☐
(Hvis nei, gå til spørsmål 5)

3 Hvilket medikament benytter pasienten *nå*? (Bare ett kryss)
Ritalin ☐ Ritalin kapsler ☐ Concerta ☐ Dexedrine ☐ Strattera ☐
Annet ☐ hva: _____

4 **Daglig dosering er ..... mg.** (Fortsett med spørsmål 9)

5 **Hvorfor ble medikamentell behandling mot ADHD avsluttet?** (Kryss av for det som passer)

Bivirkninger ☐ Manglende/lite tilfredsstillende effekt ☐ Misbruk ☐ Bedring ☐

Graviditet ☐ Manglende oppmøte ☐ Vet ikke ☐

Annet ☐ hva: _____

6 **Hvilket medikament var det *siste* pasienten *benyttet* mot ADHD?** (Bare ett kryss)

Ritalin ☐ Ritalin kapsler ☐ Concerta ☐ Dexedrine ☐ Strattera ☐

Annet ☐ hva: _____

7 **Daglig dosering var ..... mg.**

8 **Omtrent hvor lenge fikk pasienten medikamentell behandling mot ADHD? .....** (tidsperiode)
(Fortsett med spørsmål 9)

9 **Har medikamentell behandlingen mot ADHD ført til:** (Kryss av for hver linje)

	Ja	**Nei**
Psykose	☐	☐
Selvmordstanker	☐	☐
Selvmordsforsøk	☐	☐

10 **Har pasienten hatt noen av følgende bivirkninger *i mer enn to uker?***
(Skal ikke avkrysses om symptomene ikke oppfattes som bivirkninger)

Angst	☐
Blodtrykksøkning	☐
Depresjon	☐
Hjertebank/økt hjerterytme	☐
Hodepine	☐
Irritabilitet	☐
Kvalme	☐
Magesmerter	☐
Nedstemthet	☐
Nervøsitet/uro	☐
Redusert matlyst	☐
Søvnvansker	☐
Tics	☐
Tretthet	☐
Annet, hva	☐
Ikke aktuelt	☐

11 **Har noen av bivirkningene vært så alvorlige at de er meldt til RELIS?** **Ja** ☐ **Nei** ☐

APPENDIX III

FEMTI Pluss – en pilotstudie om det å bli godt voksen med ADHD - spørreskjema

Oslo universitetssykehus

FEMTI PLUSS

- en pilotstudie om det å bli godt voksen med ADHD

Du er en av ca 300 personer som i følge medlemsregisteret til ADHD Norge er 50 år eller eldre og som derfor inviteres til å delta i denne pilotstudien. Det finnes så langt nesten ingen informasjon om det å ha diagnosen ADHD når man har passert 50 år. Sammen med ADHD Norge har vi derfor tatt initiativ til en pilotstudie hvor vi ønsker å få kunnskap om akkurat dette. Pilotstudien er i sin helhet finansiert av Stiftelsen Helse og Rehabilitering.

Det er frivillig å delta. Studien er anonymisert. ADHD Norge sender ut spørreskjemaet til alle to ganger. Har du svart i første runde, kan du se bort fra henvendelsen i runde to. For at resultatene skal bli mest pålitelige, er det viktig at flest mulig svarer.

Vi har skrevet om studien i årets første nummer av STÅ PÅ (lagt ved). Ønsker du mer informasjon, kan du ta kontakt med prosjektleder Michael B. Lensing, Regionalt fagmiljø, Oslo universitetssykehus (mien@uus.no).

På forhånd tusen takk! Michael B. Lensing Tor Eikeland (generalsekretær ADHD Norge)

SPØRREUNDERSØKELSE - Kryss av for det som passer

1. Er du kvinne ❑ eller mann ❑ ?

2. Hvor i landet er du bosatt?
   Nord-Norge ❑ Midt-Norge ❑ Vest-Norge ❑
   Sør-Norge ❑ Øst-Norge ❑

3. I hvilket år er du født? 19 _____

4. Hva er din høyest fullførte utdanning?
   9-årig grunnskole ❑ Videregående yrkesfag ❑
   Videregående allmenn ❑ Høyskole/Universitet ❑
   Annet ❑

5. Hva er din sivile status?
   Gift ❑ Enke/enkemann ❑ Skilt/separert ❑
   Samboer ❑ Ugift (aldri vært gift) ❑

6. Har du noen gang hatt inntektsgivende arbeid sammenhengende i minst seks måneder? Ja ❑ Nei ❑

7. Er du i inntektsgivende arbeid nå? Ja ❑ Nei ❑

8. Betrakter du deg hovedsakelig som
   Yrkesaktiv ❑ Pensjonist ❑ Trygdet ❑
   Hjemmeværende ❑ Annet ❑

9. Sammenlignet med for ti år siden, er din arbeidsevne…
   Mye dårligere ❑ Noe dårligere ❑ Ingen endring ❑
   Noe bedre ❑ Mye bedre ❑

10. Sammenlignet med for 10 år siden, er din arbeids lyst…
    Mye dårligere ❑ Noe dårligere ❑ Ingen endring ❑
    Noe bedre ❑ Mye bedre ❑

11. I hvilket år fikk du diagnosen ADHD? _____

12. Har du fått medikamentell behandling mot ADHD?
    Ja ❑ Nei ❑

13. Bruker du medikamenter mot ADHD nå? Ja ❑ Nei ❑

    Hvis ja, hvilket medikament bruker du
    _____
    hvilken dose tar du
    _____
    og hvem skrives resepten ut av, din
    a) psykiater ❑
    b) fastlege ❑
    c) eller andre ❑

fortsettelse neste side...

DU MÅ GJERNE GI UTFYLLENDE KOMMENTAR

Send utfylt skjema tilbake til oss i vedlagte forhåndsadresserte svarkonvolutt

ADHD Norge

Prosjektet er finansiert med EXTRA-midler fra HELSE OG REHABILITERING
Stiftelsen for norske helse- og rehabiliteringsorganisasjoner

14. Har du fått annen type behandling (samtaler, terapi og lignende) mot ADHD? Ja ❑ Nei ❑

15. Har det å få diagnosen ADHD ført til en endring for deg?
Ja ❑ Nei ❑ Hvis ja, på hvilken måte? _____
_____

16. Har du fått diagnostisert andre sykdommer eller helseskader? Ja ❑ Nei ❑ Hvis ja, hvilke
_____

17. Tar du andre medikamenter? Ja ❑ Nei ❑ Hvis ja, hvilke
_____

18. Hvordan er din hyperaktivitet/rastløshet sammenlignet med for ti år siden?
Mye mer ❑ Noe mer ❑ Ingen endring ❑
Noe mindre ❑ Mye mindre ❑

19. Hvordan er din impulsivitet sammenlignet med for ti år siden?
Mye mer ❑ Noe mer ❑ Ingen endring ❑
Noe mindre ❑ Mye mindre ❑

20. Hvordan er din oppmerksomhet sammenlignet med for ti år siden?
Mye dårligere ❑ Noe dårligere ❑ Ingen endring ❑
Noe bedre ❑ Mye bedre ❑

21. Kryss av for den ruten som best beskriver hvordan du har følt og oppført deg de siste seks månedene

	Aldri	Sjelden	I blant	Ofte	Svært ofte
a) Hvor ofte har du problemer med å avslutte en oppgave etter at de interessante delene er unnagjort?	❑	❑	❑	❑	❑
b) Hvor ofte er det vanskelig å få orden på ting når du skal utføre en oppgave som krever organisering?	❑	❑	❑	❑	❑
c) Hvor ofte har du problemer med å huske avtaler eller forpliktelser?	❑	❑	❑	❑	❑
d) Når du har en oppgave som krever at du tenker nøye igjennom det du skal gjøre, hvor ofte unngår eller utsetter du å begynne på den?	❑	❑	❑	❑	❑
e) Hvor ofte sitter du og fikler med noe når du sitter lenge i ro?	❑	❑	❑	❑	❑
g) Hvor ofte føler du deg overdrevet aktiv og tvunget til å gjøre noe, som om du var drevet av en indre motor?	❑	❑	❑	❑	❑

22. Sammenlignet med for ett år siden, vil du si at din helse nå stort sett er ….?
Mye verre ❑ Noe verre ❑ Omtrent det samme ❑
Noe bedre ❑ Mye bedre ❑

23. Bruker du eller har du brukt tobakk/nikotin?
Daglig ❑ Av og til ❑ Sjelden ❑
Aldri ❑ Før, men ikke nå ❑

24. Bruker du eller har du brukt alkohol?
Daglig ❑ Av og til ❑ Sjelden ❑
Aldri ❑ Før, men ikke nå ❑

25. Bruker du eller har du brukt andre rusmidler?
Daglig ❑ Av og til ❑ Sjelden ❑
Aldri ❑ Før, men ikke nå ❑

26. Hvordan sover du nå sammenlignet med for ti år siden?
Mye dårligere ❑ Noe dårligere ❑ Ingen endring ❑
Noe bedre ❑ Mye bedre ❑

27. Hvordan er din kondisjon/fysiske form nå sammenlignet med for ti år siden?
Mye dårligere ❑ Noe dårligere ❑ Ingen endring ❑
Noe bedre ❑ Mye bedre ❑

28. Mange føler seg yngre eller eldre enn de faktisk er.
Hvor gammel føler du deg vanligvis? _____år

29. Hvor fornøyd er du med din materielle levestandard?
Svært misfornøyd ❑ Misfornøyd ❑ Både og ❑
Fornøyd ❑ Svært fornøyd ❑

30. Hvor fornøyd er du med din fritid?
Svært misfornøyd ❑ Misfornøyd ❑
Både og ❑ Fornøyd ❑ Svært fornøyd ❑

31. Hvor fornøyd eller misfornøyd er du med ditt seksualliv nå for tiden?
Svært misfornøyd ❑ Misfornøyd ❑
Både og ❑ Fornøyd ❑ Svært fornøyd ❑

32. Jeg savner å ha en virkelig nær venn/venninne
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑
Svært enig ❑

33. Jeg håndterer dagliglivets krav bra
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑ Svært enig ❑

34. Gjennom livet har mange opplevd store påkjenninger. Har du opplevd noe av det følgende etter at du fylte 16 år? Angi din alder omtrent da dette skjedde. Hvis det har skjedd flere ganger sett din alder da det sist skjedde.

a) Brutte relasjoner til fast parter:
Ja ❑ Nei ❑ Alder_____

b) Fått barn med ADHD: Ja ❑ Nei ❑ Alder_____

c) Fått barnebarn med ADHD: Ja ❑ Nei ❑ Alder_____

d) Mistet jobb: Ja ❑ Nei ❑ Alder_____

fortsettelse neste side...

e) Alvorlige økonomiske belastninger/tap:
Ja ❑ Nei ❑ Alder_____

f) Livstruende sykdom/skade:
Ja ❑ Nei ❑ Alder_____

g) Nære personer alvorlig syke:
Ja ❑ Nei ❑ Alder_____

h) Juridiske problem med rettssak:
Ja ❑ Nei ❑ Alder_____

i) Utsatt for vold: Ja ❑ Nei ❑ Alder_____

j) Utsatt for seksuelt overgrep:
Ja ❑ Nei ❑ Alder_____

35) Omtrent hvor ofte:

	Aldri	Skjeldnere	Noen ggr. i året	Hver måned, men ikke hver uke	Hver uke, men ikke daglig	Daglig	Er dette endret sammenlignet med for 10 år siden? Mer nå	Ingen endring	Mindre nå
lager du middag nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
gjør du rent nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
gjør du innkjøp nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
får du besøk nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
går du på besøk nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
hjelper du andre utenom nær familie nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
bruker du tid på dine hobbyer nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑
blir du irritert nå?	❑	❑	❑	❑	❑	❑	❑	❑	❑

36. Omtrent hvor ofte tar du deg av barnebarn?
Aldri ❑ Sjeldnere ❑ Noen ganger i året ❑
Hver måned, men ikke hver uke ❑
Hver uke, men ikke daglig ❑ Daglig ❑
Har ingen barnebarn ❑

37. Nedenfor kommer en rekke påstander om hvordan du har det nå, og hvordan du forholder deg til ulike sider ved livet. Hvor enig eller uenig er du når du tenker på deg selv for tiden?

a) På de fleste måter er livet mitt nær det ideelle
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑ Svært enig ❑

b) Mine livsforhold er utmerkede
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑ Svært enig ❑

c) Så langt har jeg fått det viktigste jeg ønsket meg i livet
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑
Svært enig ❑

d) Jeg er tilfreds med livet mitt
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑
Svært enig ❑

e) Hvis jeg kunne leve livet mitt om igjen, ville jeg ikke forandre på nesten noen ting
Svært uenig ❑ Nokså uenig ❑
Verken enig eller uenig ❑ Nokså enig ❑
Svært enig ❑

38. Kommentarer:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

fortsettelse neste side...

39. Vis hvilke utsagn som passer best på din helsetilstand i dag ved å sette et kryss i en av rutene utenfor hver av gruppene nedenfor.

Gange
Jeg har ingen problemer med å gå omkring. ❑
Jeg har litt problemer med å gå omkring. ❑
Jeg er sengeliggende. ❑

Personlig stell
Jeg har ingen problemer med personlig stell. ❑
Jeg har litt problemer med å vaske meg eller kle meg. ❑
Jeg er ute av stand til å vaske meg eller kle meg. ❑

Vanlige gjøremål (f.eks. arbeid, studier, husarbeid, familie- eller fritidsaktiviteter).
Jeg har ingen problemer med å utføre mine vanlige gjøremål. ❑
Jeg har litt problemer med å utføre mine vanlige gjøremål. ❑
Jeg er ute av stand til å utføre mine vanlige gjøremål. ❑

Smerte/ubehag
Jeg har verken smerte eller ubehag. ❑
Jeg har moderat smerte eller ubehag. ❑
Jeg har sterk smerte eller ubehag. ❑

Angst/depresjon
Jeg er verken engstelig eller deprimert. ❑
Jeg er noe engstelig eller deprimert. ❑
Jeg er svært engstelig eller deprimert. ❑

40. Din helsetilstand, se informasjon og skala

DIN HELSESTILSTAND IDAG

HELSETILSTANDEN

For å hjelpe folk til å si hvor god eller dårlig en helsetilstand er, har vi laget en skala (omtrent som et termometer) hvor den beste tilstanden du kan tenke deg er merket 100 og den verste tilstanden du kan tenke deg er merket 0.

Vi vil gjerne at du viser på denne skalaen hvor god eller dårlig helsetilstanden din er i dag, etter din oppfatning. Vær vennlig å gjøre dette ved å trekke en linje fra den sorte boksen "Din helse i dag" til det punktet på skalaen som viser hvor god eller dårlig din helsetilstand er i dag.

TAKK FOR HJELPEN!

Husk å poste besvarelsen

Notes

Notes